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Librariogenesis and Librariicide*: The Philadelphia Connection

MARTIN M. CUMMINGS

It is a pleasure to be here this evening. When the chairman of your Program Committee, Dr. John McClenahan, told me that this meeting would be in honor of Elliott Morse, I accepted his invitation enthusiastically. It is a gauge of my esteem for Elliott that my enthusiasm was in no way lessened by the communication that it is traditional for the speaker to wear a black tie.

As for tradition, surely no medical organization in this country has a better claim to invoke it than the College of Physicians of Philadelphia. In five years you will celebrate the bicentennial of your first meeting.

The first members of your College even then showed a special interest in the organization of their profession — they formed a planning committee.[1] And, in the time-honored custom of such committees, a report was issued. That report addressed a number of concerns: the need for a library, the manner in which it would be financed, how books would be acquired, where they might suitably be housed, and how the library should be staffed. It is a humbling realization that our country's first medical library identified precisely the issues that still concern us, 200 years later — buildings, books, bodies, and bucks.

Another measure of the stability of the Library of the College of Physicians is the remarkable fact that, in the 100 years since its first professional permanent librarian was appointed, there have been only three individuals to serve in that capacity. On this track record, Tony Aguirre, Elliott's successor, can look forward to retiring in A.D. 2015.

The entire career of Elliott Morse has been devoted to libraries. As an undergraduate at Haverford College he worked for four years as an assistant in the library there. After earning his B.S. at Haverford, he went on to earn a M.A. at the University of Pennsylvania and a degree in library science at Drexel University. Drexel later honored him with its distinguished-alumnus award.

*Presented before the College of Physicians of Philadelphia, December 2,.1981.

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Your scholarly colleague, Dr. Sam X Radbill, has written to me that in 1949, when Elliott came to the College of Physicians, the library was

> a private, elite, selective sort of bibliophilic mausoleum with a rich collection of medical literature buried within it. Under his directorship it came alive into a major research medical resource used nationally, indeed worldwide, as well as locally.[2]

What sort of person is the gentleman under whose leadership the library has prospered for 30 years? Let me quote again from our good friend Dr. Radbill:

> By nature genial and compassionate, his personal charm has endeared him to every member of the library staff as well as to the officers and fellows of the College. Many of his protegés have gone on to achieve success in medical libraries far and wide. In the words of his associate librarian, Mrs. Bea Davis, he instilled into every staff member the ideal of service, so that each willingly and cheerfully performed above and beyond the call of duty. For years he carried the administrative burden of the library, struggling indefatigably to keep it financially viable and battling organizational restraints, sometimes painful, that are inherent in running a nonprofit endeavor, and he reconciled the desirable with the attainable. Always polite and agreeable, he was nevertheless unyielding in whatever he conscientiously considered to be in the best interests of the College. His memory will long linger here.

My own association with Elliott was more distant, but on each occasion on which I was privileged to meet him I found him to be realistic, forward-looking, and above all proud of the College of Physicians.

The National Library of Medicine (NLM) and the College of Physicians of Philadelphia have had a long and close association, dating back to the nineteenth century. However, its beginning was not auspicious. Dr. John Shaw Billings, who headed my library from 1865 to 1895, began to lend books for use by private physicians in the 1870s. He wrote to the College of Physicians in 1875 and stipulated that "We only wish to lend books to a chartered, incorporated and responsible medical society." The College was unwilling to accept this arrangement — whether from excessive modesty in presuming to be a "responsible medical society" or from some other reason, I don't know. In any event, for two years,

Billings would not lend books to Philadelphians. Finally, the two organizations reached agreement, and the traffic between our libraries has been uninterrupted ever since.

Much as we in Bethesda revere the memory of Dr. Billings, we also hold one of your own former presidents, Dr. S. Weir Mitchell, in the highest esteem. The two were, in fact, close friends, as we know from their correspondence. In the words of a mutual friend, they could often be seen driving around Washington together "in a queer, ramshackle buggy with an indifferent-looking nag, Billings holding the reins and applying the whip."[3]

In 1895, after 30 years' service at the National Library of Medicine, Billings retired and accepted a position as Professor of Hygiene at the University of Pennsylvania. In November of that year the medical community of Philadelphia held a great banquet in his honor. The toastmaster was his friend Weir Mitchell. For his work in creating the *Index-Catalogue* and developing the Surgeon-General's Library, Dr. Billings was presented a silver box inside which was a check for $10,000, subscribed by friends in the United States and England. This must have been an uncomfortable situation for Billings, for only three days earlier he had learned that he had been selected as Director of the newly formed New York Public Library.

He left Philadelphia with reluctance but could not resist the lure of building a new library which he had designed. The subsequent gift of five million dollars from Andrew Carnegie to establish a public library system in New York gave Billings a scope of opportunity commensurate with his vision and energy.

Over the succeeding decades, the relation between NLM and the Library of the College of Physicians has remained one of mutual support and cooperation. These ties were made even closer as a result of the Medical Library Assistance Act, passed by Congress in 1965. Your own colleague, Dr. Luther Terry, as Surgeon General encouraged and assisted me in gaining the support of Senator Lister Hill, who introduced the bill. This legislation empowers NLM to make grants to support medical library activities, and also directed the establishment of a Regional Medical Library Network.

The Act was the direct result of the recommendations contained in the 1965 report of the President's Commission on Heart Disease, Cancer, and Stroke, headed by Dr. Michael E. DeBakey. In describing the need for a national network, the report said that "cooperative

service patterns have been developed impressively among existing medical libraries."[4] It cited specifically the College of Physicians of Philadelphia as an example of a library that, "frequently at economic sacrifice," provides lending services in support of libraries of hospitals and research institutions in its area. The report goes on to say that libraries like yours, and their supporting organizations, "are to be commended for their assumption of service responsibilities beyond their walls."

In the case of your library, the phrase "beyond the walls" included an important segment of the American medical establishment. In the Philadelphia area, as Elliott Morse defined it at that time,[5] there were 5 medical schools, more than 70 hospitals, 10 major pharmaceutical firms, approximately 3,500 practicing physicians, and 4 leading medical publishers, as well as schools of osteopathy, pharmacy, medical technology, and nursing. Of the approximately 18 million dollars given by the Public Health Service in 1961 to support research and training at institutions in the Philadelphia area, Elliott reported astoundingly that not one cent went directly to the College library, the area's only major medical research library.

The response from the medical institutions in your region to this lamentable state of affairs was remarkable. In 1963 local medical librarians devised a plan for meeting information needs in this area and presented it to the Director of the National Institutes of Health. Concurrently, at the Second International Congress of Medical Librarianship, Dr. Luther Terry made the case for interlibrary cooperation. In that same year, Dr. William F. Kellow, Chairman of the Deans' Committee, asked the President of the College to create an interlibrary organization that would establish a central facility to serve the medical schools and other health-sciences organizations in Philadelphia. In 1964, Dr. Richard A. Kern, former President and Honorary Librarian of the College and Dr. Leroy E. Burney visited NLM to discuss the need for Regional Medical Libraries. Later that year I visited the College and saw the regional and national resources that your library had to offer. The sustained regional commitment by institutions in your area, and the many letters of support testifying to the needs of medical libraries, played an important role in persuading the Congress that legislation was needed.

Following passage of the Medical Library Assistance Act, Elliott Morse acted rapidly to compete for funds. Within a year he had

already arranged for five years of consecutive grant support, through 1971. Following this, in rapid succession, were successful grant applications for support for recataloging, air conditioning of stack areas to preserve the collection, for training and consultation services, and for restoration of water-damaged books.

Later his colleagues, especially Dr. John Hubbard, won special support from NLM for the College's Francis Clark Wood Institute for the History of Medicine. This Institute is an important center for teaching and research in the history of medicine and it draws on the College's remarkable collection of incunabula, manuscripts, letters, engravings, and photographs.

Elliott Morse and College officials were successful in having the Library of the College of Physicians designated in 1968 as the Regional Medical Library for the Mideastern Region. Under the euphonious acronym MERMLS, the College provides information services to the 400 participating health-science institutions in Pennsylvania and Delaware. Among these services are document delivery, online database orientations, consultations, workshops, and a monthly newsletter.

Since the Act was passed, more than $4.5 million has been granted to the Library of the College of Physicians. The combination of these NLM-funded activities and such existing innovative programs as your Medical Documentation Service has resulted in an array of excellent library and information services for health professionals in the MERMLS region.

We have had a number of other connections to Philadelphia, among them a major award of almost $2 million for the construction of a medical school library. In the period 1971-1981, in addition to support for the Regional Medical Library, NLM has awarded some $4 million in 19 grants to Philadelphia institutions and 42 grants to institutions throughout Pennsylvania.

The Board of Regents of the National Library of Medicine has had several outstanding members from Philadelphia. Isidor S. Ravdin, M.D., who was Professor of Surgery at the University of Pennsylvania, served as a member of the very first Board, in 1956, and later as Regents' chairman. Ethel Weinberg, M.D., Associate Dean of the Medical College of Pennsylvania also served as a Regent, in the seventies. Today, Edward J. Huth, M.D., Editor of the *Annals of Internal Medicine*, is one of the current Board members.

We were pleased to learn that the University of Pennsylvania

Medical School recently selected as its Medical Library director a person who had spent a year of advanced training in the Health Sciences Library Management Intern Program, sponsored by NLM and the Council for Library Resources.

Highly imaginative, energetic librarians are required today, as never before, for our medical libraries are faced with grave threats from both inside and outside the profession. The external perils are not difficult to comprehend and their solution, although certainly not easy, at least lies within our means.

I see at least two external threats, neither of which is exactly new, but neither do they show signs of abating. The first is the growth of scientific knowledge. This is hardly a disturbing trend, you say, and we certainly don't want it to cease. The problem, however, is the recorded form of this knowledge, namely books and journals. Their rapid proliferation is increasingly burdensome to libraries, to say nothing of the problems of readers trying to stay abreast of their field.

In his book, *The Wired Society*,[6] James Martin has estimated that by the year 2040 there will be 200 million different books, requiring 5000 miles of shelves and a card catalog of 750,000 drawers. Even more intimidating is the growth in scientific journals. Beginning in 1750 the number of extant journals has increased tenfold every 50 years. By 1900 there were 10,000; by 1950, 100,000; and the projected one million by the year 2000 only makes me glad that by then I won't be Director of the National Library of Medicine.

The other trend, keeping pace with the proliferation of biomedical literature, is the inflation associated with medical publishing. Recently, an editorial[7] in the *New England Journal of Medicine* estimated that the standard medical textbook now sells for $35 to $60. The cost of heavily illustrated books, such as those on computed tomography, ultrasound, isotope imaging, dissection atlases, and surgical technique, regularly exceeds $100.

When these two trends — the increasing size of the literature and the skyrocketing costs of purchase — are combined with level or even decreasing library budgets, the result is predictable: libraries must cut back on the acquisition of new material. This is confirmed by studies that show many libraries are cancelling journal subscriptions and, to an even greater degree, are reducing their purchases of books.[8]

I mentioned earlier that there are means at hand to cope with these external problems. Computerized retrieval systems such as

MEDLINE permit rapid and inexpensive searching through the vast and growing corpus of medical literature. New optical disc technology will permit the storage and retrieval of vast collections of literature at modest cost in small space. The Regional Medical Library Network makes it possible to share the documents themselves, efficiently and at reasonable cost to the user. These national systems will be improved even more in the near future, and we are confident that we will be able to deal successfully with the increasing literature and the costs associated with purchasing and processing it.

More distressing than these external threats are some shafts of ill-considered criticism that wound, and some downright destructive suggestions about the NLM role. Both come from inside the library and information community.

One of the candidates for the presidency of the Medical Library Association, a Philadelphia medical school librarian, I regret to say, saw fit to campaign on the premise that NLM training programs in medical computing were nothing more or less than "...for the intellectual amusement of junior physicians and unemployed Ph.D.s."

It is difficult to know how to respond to this wholly false and misleading allegation. The characterization that physicians and scientists who engage in computer research and training do so for intellectual amusement or because they are unemployed should not remain unchallenged. Surely no responsible medical librarian should resent physicians who become interested in library and information problems.

In recent years, much of our emphasis in research and training has been directed toward supporting innovative applications of computer and telecommunications technology in library and information dissemination contexts. The NLM Act specifically encourages research programs to develop "new techniques, systems, and equipment for processing, storing, retrieving, and distributing information," and training programs to develop health information specialists who are competent in "automatic data processing and retrieval." The National Library of Medicine must continue to work at the cutting edge of modern information technology in order to deal better with the threat of information inundation.

Since the passage of the Medical Library Assistance Act in 1965, NLM has been able to award approximately $130 million. Of this amount, $70 million, or well over half, has gone for support of basic medical library services and facilities. The remainder has been used

to support research, training, and publications, as authorized by the act. NLM will do all it can to preserve these NLM programs that directly support conventional library services. We plan to protect the medical library resource grant program despite an over-all cut of $1.5 million in medical library assistance. This is a reduction of 16 percent of all medical library assistance funds available to us in 1982 and will affect adversely our ability to support the Regional Medical Library network.

This reduction in our funds was encouraged by several members of the profit-making information sector who view NLM as a competitor to their commercial interests. A large Dutch publishing firm which sells bibliographic information through an American subsidiary has been lobbying the U.S. Congress to force the National Library of Medicine to recover full costs of its library services.

Another such attack has come from a large Philadelphia-based information company. A few excerpts from the Congressional testimony,[9] that the president of this company presented when the renewal of the Medical Library Assistance Act was being considered, are cited:

> The MEDLINE service offered by NLM is a highly subsidized service that competes unfairly with services of various information providers .... In my opinion, support for the program which provides computer science training for MDs and other medical specialists could be significantly reduced without causing any hardships.

He also objected to NLM's plans for an improved MEDLARS system. His testimony suggested that all NLM grant programs be reduced except for resource grants which could provide funds to purchase books, journals and information services.

This is a new Philadelphia connection, which we neither seek nor wish to continue, since it is damaging to medical libraries everywhere.

For more than 100 years our library has been collecting, organizing, and disseminating the world's biomedical literature. We are an archive not only for the portion of the literature that is frequently consulted, but we are also a repository for the arcane, the poorly accessible publications of distant lands, and medical rarities and historical materials. The Congress has recognized the value of a comprehensive national information resource in the health sciences, and has supported the library generously in recent decades.

Concurrently with this archival function, NLM has been a leader in applying computer science and other modern technologies to the handling of this information. The systems that have evolved now make it possible for American physicians, through their local medical libraries all over the country, to have rapid access to this information, paying necessary fees to cover the cost of access. Now that these systems are installed and operating successfully, private information vendors see an opportunity to provide similar services for profit. By so doing they would create an additional burden on the taxpayer, who often supported the research which is published. Also the literature which is cited is often not available from the database vendor and this creates a demand for lending or photocopy service from libraries such as yours and ours.

I believe that, if successful, this movement to commercialize library services can only lead to damaging a successful system that has been in operation for more than a century. To demand that NLM either give up its bibliographic services or raise its fees drastically so that private companies can compete more easily could seriously impair the ability of health practitioners, educators, and researchers to have equitable and easy access to their scientific literature. It would, in fact, make the literature available only to those who could afford to pay for it. I do not consider this to be in the public interest.

We need to take a look at the long-range consequences. The public may find itself paying commercial firms for information derived from federally funded research and for some of the publications already paid for by their tax dollars as page charges. The public must decide soon whether medical information is a commodity to be bought and sold for profit or whether it should be freely available for easy and equal access to all members of society as a public good.

Lest I be accused of being against private enterprise, let me assure you that at NLM we appreciate the important role of the private sector. Several private companies take our most important publications, without compensation to NLM, and vend microfilm editions for profit. Our catalog cards are sold for profit by a private company, again without compensation to NLM. We cooperate with reprint companies which wish to sell out-of-print NLM bibliographies and indexes. We provide millions of dollars to private companies which assist us, under contract, in indexing the biomedi-

cal literature and in improving the performance of our computer system. Several of these firms are located in Philadelphia. Also, we lease our computer tapes to any commercial firm that wishes to use them to provide products and services to the biomedical community for profit.

Perhaps I have painted an unduly gloomy picture. There are proper roles for the private and the public sectors in providing health information. I know that this audience appreciates the true value of medical library services, for you have been well instructed by Elliott Morse.

We need more dedicated and responsible library leaders like him to blunt the threats of those who would exploit the public good for private gain. By their false and unfair pronouncements all libraries may be destroyed, a type of "librarícide" more insidious than damage from flood or fire. We need to maintain libraries such as yours because they serve as the binding influence on a subdividing profession. This attribute, discussed by Harvey Cushing at the dedication of the William H. Welch Medical Library of the Johns Hopkins School of Medicine in 1929, deserves our recommitment. The College library also serves to create and to extend new ideas while it preserves the historical record of our profession.

The Philadelphia connection of which I am most proud is my honorary Fellowship in your distinguished college. It is reinforced by the long-standing collaboration between your great library and the National Library of Medicine. Do not allow intemperate or selfish actions to destroy these bonds, developed over a century.

National Library of Medicine
Bethesda, MD 20209

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On Varro's *animalia quaedam minuta* and Etiology of Disease

JOANNE H. PHILLIPS

IN his *De Re Rustica*, published in 37 B.C., Marcus Terentius Varro (116-27 B.C.), the reknowned late-Republican polyhistor, makes several statements regarding the etiology of disease. One of these has long been of great interest to medical historians. At *Rust.* 1.12.2 Varro expresses the view that disease is attributable to certain minute creatures (*animalia quaedam minuta*), too small to be seen, which are bred in swamps, are then borne through the air, and enter the body through the mouth and nostrils. This statement, the sole ancient reference to such a theory of disease, became a *locus classicus* mentioned or quoted by innumerable authors since Alberti in his treatise *De Re Aedificatoria* (1458).[1] It has resulted in Varro being considered not only the earliest proponent of what later became known as the animalcular hypothesis of disease,[2] but also the founder of microbiology.[3]

Varro's famous statement deserves to be examined in the context of his other remarks about the etiology of disease. Such an examination — the aim of this paper — (1) raises speculation as to why Varro's statement attributing disease to invisible *animalia minuta* was ignored by his Graeco-Roman successors, (2) suggests that Varro should not be considered an animalculist without considerable

1. *Aiebat Varro compertum habere se locis quibusdam minutissima quaedam atomorum instar volitare animantia aere et anhelitu in pulmones excerpta haerere praecordiis et rodendo inferre morbum atrum et tabificum atque perinde pestem pernitiemque afferre* (L.B. Alberti, *De Re Aedificatoria*, ed. G. Orlandi [Milan, 1966], 1: 49). On the considerable historical range of subsequent references to Varro (*Rust.* 1.12.2), see in particular S. Jarcho, "Medical and Nonmedical Comments on Cato and Varro, with Historical Observations on the Concept of Infection," *Trans. & Studies of the Coll. of Phys. of Philadelphia*, ser. 4, 43 (1976): 375 and 377-78, notes 35-45.

2. See Jarcho (note 1) 374-75; also, K. Sallmann, "M. Varro Quid Ad Medicinam Contulerit," in the *Atti del Congresso Internazionale di Studi Varroniani, Rieti, Italy (Settembre, 1974)* (Rieti, 1976): 507-13; idem, "M. Terentius Varro und die Anfänge der Mikrobiologie," *Gymnasium* 83 (1976): 224-25.

3. Sallmann (note 2 [Rieti, 1976]) 513; (note 2 [1976]) 228.

qualification, and (3) suggests a possible source for Varro's ideas on the etiology of disease — namely, the didactic poem, *De Rerum Natura*, by the contemporary poet of Epicureanism, Lucretius (c. 99-55 B.C.).

Part I

Let us commence with a translation of the pertinent passages.[4] The form in which the *De Re Rustica* is written is that of the dialogue or conversation, in which several speakers take part. Varro makes Gnaeus Tremelius Scrofa,[5] a leading contemporary agronomist, the speaker of the following passages. In the first group, 1.4.3-5, the topic under discussion is the necessity of a healthful location for the farm (*fundus*). In the second group, 1.12.1-3, it is the necessity of a proper location for the steading (*villa rustica*):

> 1.4.3:[6] Further, land which is more healthful (*salubrior*) is the most valuable, because on it the profit is certain; while, on the other hand, on land that is unhealthy (*in pestilenti*),[7] however rich it may be, misfortune does not permit the farmer to reap a profit. For indeed

4. The translations here (and elsewhere in this paper, unless indicated) are my own. I use the text of G. Goetz, ed., *M. Terenti Varronis rerum rusticarum libri tres* (Leipzig, 1929).

5. Gnaeus Tremelius Scrofa apparently wrote an agricultural treatise himself (cf. R. Reitzenstein, *De scriptorum re rusticae qui intercedunt inter Catonem et Columellam libris deperditis* [diss. Berlin, 1884], pp. 12 sqq.; F. Münzer, s.v. "Tremelius" in *Pauly-Wissowa's Real Encyclopädie der klassischen Altertumswissenschaft* [Stuttgart, 1893-] vol. 6A, cols. 2287-89). The fact that Scrofa, a close friend of Varro's and a prominent member of Roman society, is not referred to as an agricultural writer in the *De Re Rustica* is inexplicable and has given rise to much inconclusive conjecture (see J.E. Skydsgaard, *Varro the Scholar. Studies in the First Book of Varro's "De Re Rustica"* [Copenhagen, 1968], pp. 65-66.

6. *Utilissimus autem is ager qui salubrior est quam alii, quod ubi fructus certus; contra in pestilenti calamitas, quamvis in feraci agro, colonum ad fructus pervenire non patitur. Etenim ubi ratio cum orco habetur, ibi non modo fructus est incertus, sed etiam colentium vita. Quare ubi salubritas non est, cultura non aliud est atque alea domini vitae ac rei familiaris.*

7. On my rendering here of *in pestilenti* (cf. *pestilentior*, 1.4.4), see Cicero, *De Fato*, 4.7: *Inter locorum naturas quantum intersit videmus: alios esse salubres, alios pestilentes...*

where the reckoning is with death, not only is profit uncertain, but also the life of the farmers. Therefore, when there is no state of healthfulness (*salubritas*), agriculture becomes nothing but a game of chance, in which the life and property of the owner are at stake.

1.4.4:[8] And yet this risk can be lessened by science (*scientia*); for, granting that healthfulness (*salubritas*) being a product of climate and soil (*e caelo ac terra*), is not in our power but in that of nature, still it depends greatly on us, because we can, by care, lessen the evil effects. For if the farm is unhealthy (*pestilentior*) on account of the nature of the land or the water, from the miasma (*odore*) exhaled in some spots; or if, on account of the climate, the land is too hot or the wind is not salubrious (*non bonus*), these faults can be alleviated by the science and outlay of the owner. The situation of the buildings, their size, the exposure of the galleries, the doors, and the windows are matters of the highest importance.

1.4.5:[9] Did not the famous physician, Hippocrates, during a great plague save not one farm but many cities by his skill?[10] But why do I cite him? Did not our friend Varro here, when the army and fleet were at Corcyra, and all the houses were crowded with the sick and dead, by cutting new windows to admit the north wind, and shutting out the infected winds (*obstructis pestilentibus* sc. *ventis*), by changing the position of the doors, and other precautions of the same kind, bring his comrades and servants back safe and sound (*incolumes reduxit*)?[11]

***

8. *Nec haec non deminuitur scientia. Ita enim salubritas, quae ducitur e caelo ac terra, non est in nostra potestate, sed in naturae, ut tamen multum sit in nobis, quo graviora quae sunt ea diligentia leviora facere possimus. Etenim si propter terram aut aquam odore, quem aliquo loco eructat, pestilentior est fundus, aut propter caeli regionem ager calidior sit, aut ventus non bonus flet, haec vitia emendari solent domini scientia ac sumptu, quod permagni interest, ubi sint positae villae, quantae sint, quo spectent porticibus, ostiis ac fenestris.*

9. *An non ille Hippocrates medicus in magna pestilentia non unum agrum, sed multa oppida scientia servavit? Sed quid ego illum voco ad testimonium? Non hic Varro noster, cum Corcyrae esset exercitus ac classis et omnes domus repletae essent aegrotis ac funeribus, immisso fenestris novis aquilone et obstructis pestilentibus inuaque permutata ceteraque eius generis diligentia suos comites ac familiam incolumes reduxit?*

10. Cf. Pliny, *HN* 7.123: *...Hippocrates medicina, nam venientem ab Illyriis pestilentiam praedixit discipulosque ad auxiliandum circa urbes dimisit, quod ob meritum honores illi quos Herculi decrevit Graecia.*

11. 48 B.C.: Varro, after surrendering to Caesar in Spain, had joined Pompey's forces which were stationed at Corcyra before Pharsalia.

1.12.1:[12] Care should be taken especially, in locating the steading, to place it at the foot of a wooded hill, where there are broad pastures, and so as to be exposed to the most healthful winds that blow in the region (*...ventos, qui saluberrimi in agro flabunt*). A steading facing the east has the best situation, as it has the shade in summer and the sun in winter. If you are forced to build on the bank of a river, take care not to let the steading face the river, as it will be extremely cold in winter and unhealthy (*non salubris*) in summer.

1.12.2:[13] Precautions must also be taken in the vicinity of swamps, both for the very reasons given above, and because there are bred certain minute creatures (*animalia quaedam minuta*) which the eyes are not able to detect and which pass through the air and into the body through the mouth and nostrils and cause serious diseases. "What can I do," asked Fundanius, "to prevent disease if I should inherit a farm of that kind?" "Even I can answer that question," replied Agrius, "sell it for the highest price; or if you cannot sell it, abandon it."

1.12.3:[14] Scrofa, however, replied: "See that the steading does not face in the direction from which the infected wind usually comes (*e quibus ventus gravior afflare soleat*), and do not build in a hollow, but rather on elevated ground, because a well-ventilated location is more easily cleared if anything obnoxious is brought in. Furthermore, being exposed to the sun during the whole day is more healthy, because any little creatures (*bestiolae*), if any are bred nearby and brought in, either are blown away or perish quickly from the lack of humidity."

12. *Danda opera ut potissimum sub radicibus montis silvestris villam ponat, ubi pastiones sint laxae, item ut contra ventos, qui saluberrimi in agro flabunt. Quae posita est ad exortos aequinoctiales, aptissima, quod aestate habet umbram, hieme solem. Sin cogare secundum flumen aedificare, curandum ne adversum eam ponas; hieme enim fiet vehementer frigida et aestate non salubris.*

13. *Advertendum etiam, siqua erunt loca palustria, et propter easdem causas, et quod crescunt animalia quaedam minuta, quae non possunt oculi consequi, et per aera intus in corpus per os ac nares perveniunt atque efficiunt difficilis morbos. Fundanius, Quid potero, inquit, facere, si istius modi mi fundus hereditati obvenerit, quo minus pestilentia noceat? Istuc vel ego possum respondere, inquit Agrius; vendas, quot assibus possis, aut si nequeas, relinquas.*

14. *At Scrofa, Vitandum, inquit, ne in eas partes spectet villa, e quibus ventus gravior afflare soleat, neve in convalli cava et ut potius in sublimi loco aedifices, qui quod perflatur, siquid est quod adversarium inferatur, facilius discutitur. Praeterea quod a sole toto die illustratur, salubrior est, quod et bestiolae, siquae prope nascuntur et inferuntur, aut efflantur aut aritudine cito pereunt...*

Part II

Let us now examine these comments of Varro. His brief pronouncement (*Rust.* 1.12.2) that certain tiny creatures (*animalia quaedam minuta*), bred in swamps and of a size below that of visibility, are the causes of disease, is unique in antiquity. There is no exposition of this theory by earlier or contemporary Greek or Roman writers.[15] Even more remarkable, there is no reference to Varro's seemingly original theory in subsequent Graeco-Roman literature.[16]

15. The Hippocratic tradition does evince the concept of invisibility with regard to the etiology of disease in the environ of swamps. This concept, however, is associated with miasmas — invisible, malodorous marsh vapors or exhalations that can cause disease. See here Hippocrates, *De humoribus* 12 (V, 492 Littré). Cf. *De natura hominis* 9 (VI, 52 Littré); *de aere aquis et locis* 7 (I, 26 Littré); *de flatibus* 6 (VI, 96, 98 Littré). All references here are to the edition of E. Littré, *Oeuvres complètes d'Hippocrate*, 10 volumes (Paris, 1839-61).

The concept of invisibility is never applied to living organisms. As Sallmann has recently demonstrated (note 2), pp. 217-18, the smallest organisms seem to be maggots (eulai) or various other worms (e.g. skōlēkes; askarides), which arise by spontaneous generation to the accompaniment of putrefaction, either in the case of the former from the flesh on human or animal cadavers (cf. Hom. *Il.* 19.24; 24.414; Arist. *HA* 551^{a}28-551^{b}2; askarides: 506^{a}30), or in the case of the latter from putrefying mud, dung, or wood (cf. skōlēkes: Theoph. *HP* 3.1216; 5.4.4; Arist. *HA* 551^{b}28-552^{a}5), and which are transformed subsequently into insects (or even into eels and other sea creatures [Arist. *HA* 570^{a}3-23]). Cf. here also, D.M. Balme, "Development of Biology in Aristotle and Theophrastus: Theory of Spontaneous Generation," *Phronesis* 7 (1962): 91-104. There is no indication that such organisms as these, or any insects which developed from these, or other insects in general, appear to have been associated with the causality of disease (cf. here, W.H.S. Jones, *Malaria. A Neglected Factor in the History of Greece and Rome* [London, 1907], p. 54.

In extant literature of the Late Roman Republic the miasma hypothesis appears still to prevail, altered somewhat to accommodate Epicurean physics, as is evinced by Lucretius' discussion of the etiology of disease in Book 6.1090-1137 of his *De Rerum Natura.* See my discussion here, "The Etiology of Disease: A Late Roman Republican View," in *Actas. XXVII Congreso Internacional de Historia de la Medicina, 31 agosto-6 septiembre 1980* (Barcelona: Academia de Ciencies Mediques de Catalunya i Balears, 1981) 1: 327-30.

16. I concur here with Sallmann (note 2), pp. 219-20, that Varro's theory in 1.12.2 cannot be traced historically through Vitruvius (*De Arch.* 1.4.1), Columella (*Rust.* 1.5.6), and Palladius (*Opus Agr.* 1.7). Vitruvius' view concerning the etiology of disease in the environ of a swamp is strictly the miasma hypothesis: *...deinde sic vitabitur palustris vicinitas. Cum enim aurae matutinae cum sole oriente ad oppidum pervenient*

Why did Varro's theory have no apparent effect on his Graeco-Roman successors? Given the number of problems of interretation involved, it is not unreasonable to hypothesize that Varro's statement at 1.12.2 both in itself and with regard to his other statements on the etiology of disease may have been ambiguous, or incomprehensible.

First, to the Roman reader of the early Empire the term *animal/animalia* (pl.) frequently signified insects or worms — small, visible creatures, especially insects that cause injury, but not disease, by a sting or bite.[17] Accordingly, Varro's use of the phrase *animalia quaedam minuta* with reference to a swamp locality and to creatures being borne through the air probably would have brought to the mind of the reader a mental image of a specific insect — the mosquito. Apropos here is a comment by Columella (fl. c. 50 A.D.),

et his ortae nebulae adiungentur spiritusque bestiarum palustrium venenatos cum nebula mixtos in habitatorum corpora flatu spargent, efficient locum pestilentem (Vitruvius, *De Architectura*, ed. F. Granger [Cambridge, Mass., 1931]). Columella combines the miasma hypothesis with a reference to Aristotle's theory of spontaneous generation of worms; he goes so far, however, as to attribute disease to the swimming and crawling creatures (*pestes*): *Nec paludem quidem vicinam esse oportet aedificiis ... quod illa caloribus noxium virus eructat et infestis aculeis armata gignit animalia, quae in nos densissimis examinibus involant, tum etiam nantium serpentiumque pestes hiberna destitutas uligine, caeno et germentata colluvie venenatas emittit, ex quibus saepe contrahuntur caeci morbi, quorum causas ne medici quidem perspicere queunt...*(Columella, *De Re Rustica*, ed. H.B. Ash [Cambridge, Mass., 1941]). Palladius merely appears to refer to Columella's statement in abbreviated fashion: *Palus tamen omni modo vitanda est ... propter pestilentiam vel animalia inimica quae generat* (Palladius, *Opus Agriculturae*, ed. J.C. Schmitt [Leipzig, 1898]).

17. E.g. (insect) Verg. *Georg.* 4.309; Cel. *Med.* 6.7.9A; Sen. *Ep.* 94.41; Pliny *HN* 22.108; 20.247; 9.154; 11.1. (worm) Ov. *Met.* 15.363; Col. *Rust.* 6.16.2; 11.3.63. Cf. here *TLL*, s.v. "animal": minuta.

In extant Latin literature the term *animal/animalia*, interestingly enough, occurs first in the works of such contemporaries as Lucretius, Cicero, and Varro. It is used most often (1) to classify an animate entity, including man, as a living being or creature in general, or (2) to specify a living being or creature, other than man, in particular. The term is used less often to describe the world and other entities not always regarded as animate (e.g. Varro, *L.L.* 5.102, extends the usage to include plants: *Proxima animalia sunt ea quae vivere dicuntur neque animam, ut virgulta*); to characterize living offspring as opposed to an egg; to signify contempt for a man. On the various usages of the term, see especially here *TLL*, s.v. "animal"; also, F. Polle, *De Artis Vocabulis Quibusdam Lucretianus* (Dresden, 1866), pp. 22-36 on *animal/animalia*.

who in 1.5.6 of his *De Re Rustica* discusses the unhealthfulness of the swamp environment:

> ...neither should there be any swamp-land near the buildings ... for [it] throws off a baneful stench (*noxius virus*) in hot weather and breeds insects armed with annoying stings (*animalia armata*) who attack us in dense swarms...[18]

Without further clarification, Varro also describes his *animalia quaedam minuta* as invisible and as capable of causing disease by entering the body through the mouth and nostrils. The identity of such creatures would have been enigmatic to Roman readers.

Second, to Romans of the early Empire the term *bestiola/bestiolae* (pl.) also signified small visible insects or worms.[19] Varro uses the term twice. In *Rust.* 2.5.14 his use of the term clearly possesses this meaning; in the dialogue, Vaccius is made to say the following, as he discusses the husbandry of cows:

> The cows should be pastured in grassy and watered ground, and care should be taken not to let them crowd, be struck, or run against each other. As cattle-flies have a way of tormenting them in summer and certain tiny insects (*bestiolae quaedam minutae*) grow under their tail, some breeders are wont to shut them up in pens, to keep them from being harassed.[20]

18. For the text, see note 16. Despite the apparent prevalence of malaria in Greece from about 400 B.C. onwards and in Italy from about 200 B.C. onwards, the mosquito was never associated with the disease or any of its symptoms; the insect was regarded as merely a bothersome creature, whose bite was best repelled, often by nets (cf. Hdt. 2.95.2; Varro, *Rust.* 2.10.8.). See, Jones (note 15); A. Celli, *The History of Malaria in the Roman Campagna From Ancient Times* (London, 1933), pp. 12-47; cf. P.H. Futcher, "Notes on Insect Contagion," *BHM* 4 (1963): 543.

19. E.g. (insect) Scrib. Larg. 39; 151; Pliny *HN* 1.22.8; (cf. 22.163); 11.15. (worm) Pliny *HN* 18.308; Col. *Rust.* 11.3.64. Cf. the similar Late Republican usage: Cic. *Tusc.* 1.94; *N.D.* 2.144. See *TLL*, s.v. "bestiola".

20. *Eas* (sc. *vaccas*) *pasci oportet locis viridibus et aquosis. Cavere oportet ne aut angustius stent aut feriantur aut concurrant. Itaque quod eas aestate tabani concitare solent et bestiolae quaedam minutae sub cauda ali, ne concitentur, aliqui solent includere saeptis* (Goetz). Not unreasonably *bestiolae quaedam minutae* may also be rendered as "certain tiny worms."

Varro's second use of the term *bestiola/bestiolae* is ambiguous. Scrofa has just been speaking of the enigmatic creatures that he calls *animalia quaedam minuta* in 1.12.2; then in 1.12.3 he refers to them as *bestiolae*.[21] Again the Roman reader would have been perplexed as to what exactly Varro meant contextually by his *animalia quaedam minuta* or by his reference to them as *bestiolae*.

Third, there is yet another source of probable perplexity for the Roman reader — namely, a statement regarding the etiology of disease made earlier in the *De Re Rustica* by Scrofa, which appears inconsistent with his remark concerning the etiology of disease in 1.12.2. In 1.4.3 Scrofa is made to say:

> ...If the farm is unhealthy (*pestilentior*) on account of the nature of the land or water, from the miasma (*odore*) exhaled in some spots ... these faults can be alleviated by the science and outlay of the owner.[22]

Here Scrofa attributes the unhealthfulness of a locality to malodorous vapors. As Jarcho has astutely pointed out, with regard to these two different statements concerning the etiology of disease, 1.12.2 and 14.3 respectively, Varro would appear to be both a miasmatist and an animalculist.[23]

The ambiguous meaning of Varro's *animalia quaedam minuta* in 1.12.2, of his reference to them as *bestiolae* in 1.12.3, and the apparent conceptual inconsistency with regard to his view regarding the etiology of disease, are not surprising, even unexpected, given what we surmise now to have been the prolific writer's method of

21. For the text, see note 14. Cf. here Col. *Rust.* 11.3.63-64 where *animalia* and *bestiolae* are used synonymously unambiguously to signify worms (i.e. probably caterpillars): *Ubi vero apricis regionibus post pluvias noxia incesserunt animalia, quae a nobis appellantur erucae, Graece autem kampai nominantur. . . Sed Democritus in eo libro, qui Graece inscribitur Peri antipathon, affirmat has ipsas bestiolas enecari, si mulier, quae in menstruis est, solutis, crinibus et nudo pede unamquamque aream ter circumeat: post hic enim decidere omnes vermiculos, et ita emori.*

22. For the text, see note 8.

23. Jarcho (note 1), p. 376.

composition and his usual treatment of literary sources.[24] Varro seems to have read voraciously and widely, hastily making excerpts, which were written down (probably by a scribe) unaltered or perhaps in the form of digests or mere notes.[25] It appears that he wrote his literary compositions as rapidly as possible, often without pausing to recast, revise, or even re-read. As Skydsgaard has recently demonstrated,[26] Varro did not hesitate to use his excerpts freely. Sometimes he quoted verbatim. Sometimes he merely paraphrased, often using a single term that recurs as if by way of an allusion to, or reminiscence of, the source. He seems to have paid little attention to the possibility that what he wrote might actually conflict with the original views of the source, and that an excerpt wrongly inserted produced errors of fact, or often a distortion of the source.

If it is assumed that Varro's methods of composition and of handling of sources apply here, the inconsistency that occurs with regard to the etiology of disease is explicable. Is it also possible, with caution, to suggest a source from which Varro may have culled excerpts, which he later handled hastily or carelessly and without full comprehension, thus producing the ambiguities of interpretation which are noted above with regard to his *animalia quaedam minuta*?

In his bibliography to the *De Re Rustica* (1.1.8-11), Varro does not mention any Roman authors, but his possible use of such authors should not be discounted. He clearly refers to the Latin works of the Sasernae at 1.2.22 and Cato the Elder at 1.2.28. In *De noxiis paludum effluviis eorumque remediis libri II* (1718), Lancisi suggested the possibility that Lucretius' *De Rerum Natura* was the source of Varro's theory of *animalia quaedam minuta*. Unfortunately, the verses which

24. Varro is quoted by Gellius (*N.A.* 3.10.17) as saying that by the beginning of his seventy-eighth year he had written nearly seventy 'hebdomads' of books. On Varro's method of composition and treatment of sources, see Skydsgaard (note 5), chpt. 5, "Varro and the Technical Literature," pp. 64-88; cf. also E. Laughton, "Observations on the Style of Varro," *Classical Quarterly* nsv. 10 (1960): 1-28.

25. Varro also derived his remarks from two other sources — his own practical experience and conversation with experts: *Ea erunt ex radicibus trinis, et quae ipse in meis fundis colendo animadverti, et quae legi, et quae a peritis audii* (*Rust.* 1.1.11).

26. Skydsgaard, loc. cit. (note 24), demonstrates Varro's treatment of sources by examining his use of Theophrastus for botanical arguments in Book 1 of the *De Re Rustica*.

Lancisi cites in support of his position are not found in the extant *De Rerum Natura*.[27] The suggestion, however, warrants further consideration.

Although in Varro's *De Re Rustica* we find the sole reference to *animalia* compositely characterized as (1) *minuta* in the apparent sense of invisible, (2) produced in the special environmental conditions of a swamp, (3) borne through the air, and (4) taken into the body through the nostrils and mouth, thereby causing disease, there are in Lucretius' *De Rerum Natura*, as we now possess it, a number of passages which can be adduced as possibly accounting for all four of these characteristics.

At 4.26-822 of the *De Rerum Natura* Lucretius' aim is to explain the nature of sensation and thought in terms of Epicurean physical theory — an extreme materialism based on atomism and designed to dispel and discredit popular fears of the gods, death, and the afterlife. In order to explain in atomic terms the sensation of sight, Lucretius, following Epicurus closely, presents the view that vision is due to idols (*simulacra*)[28] — invisible atomic configurations which come off objects and impinge upon the sense-organs involved (i.e., the eyes). After proving the existence of invisible idols (4.26-109), he attempts to demonstrate their fineness of texture. He begins by reminding the reader of the extreme smallness of the atoms, which compose the idols — many stages below the possibility of perception. Then he provides an analogy based on creatures, *animalia* (4.116), which he describes by the adjective *minuta* (4.122), and which, though visible, are so small that a third part of them cannot be seen (4.117).

> Come now and learn of how thin a nature this image (idol) is formed. And to begin with, since the first-beginnings (*primordia*) are so far beneath the ken of our senses, and so much smaller than the things which our eyes first begin to be unable to descry, yet now that I may assure you of this too, learn in a few words how fine in texture are the beginnings of all things. First of all there are living things (*animalia*) so small that a third part of them could by no means be

27. *Huius vero opinionis fundamentum iecit etiam Lucretius ubi physicam veritatem poëtico stylo delineans cecinit ... obnoxia cuncta putrori/Corpora putrores insecta animata sequuntur*; G.M. Lancisi, *De noxiis paludum effluviis eorumque remediis libri II* (Geneva, 1718), p. 30.

28. Lucretius also uses the terms *imago* (52), *efficies* (42) and *figura* (42) for "idols".

> seen. Of what kind must we think any one of their entrails to be? What of the round ball of their heart or eye? what of their members? What of their limbs: how small are they? still more, whereof their soul and the nature of their mind must needs be formed. do you not see how fine and how tiny (*minuta*) they are?[29]

The verbal echoes of Varro's *animalia quaedam minuta, quae non possunt oculi consequi* (*Rust.* 1.12.2) are apparent here. We are dealing in conjecture, but Varro possibly in hasty perusal of this Lucretian passage may have been impressed with the collocation *animalia minuta* (it occurs nowhere else in extant contemporary Latin literature) and subsequently reproduced it. Possibly behind Varro's statement regarding the invisibility of the *animalia* (*quae non possunt oculi consequi*) is either a hasty misconstrual of Lucretius' statement in verse 113 regarding the invisibility of the *primordia* (*quam quae primum oculi coeptant non posse tueri*), or failure to take note of the word *tertia* in verse 116 (*animalia ... quorum/tertia pars nulla possit ratione videri*).

At 2.589-599 Lucretius states that the earth contains the seeds of all things (*principio tellus habet in se corpora prima*, 589) and is, therefore, the supreme example of a compound containing all atomic shapes. At 2.865-885 he tells us that if atoms of the right kind are placed in the right position and arrangements and perform thereby the right motions, then in the compound body formed sensation results; furthermore, change in the internal arrangement of the atoms in a compound gives rise to the creation of a sentient being. Lucretius

29 *Nunc age quam tenui natura constet imago* 110
percipe. et in primis, quoniam primordia tantum
sunt infra nostros sensus tantoque minora
quam quae primum oculi coeptant non posse tueri,
nunc tamen id quoque uti confirmem, exordia rerum
cunctarum quam sint subtilia percipe paucis. 115
primum animalia sunt iam partim tantula, quorum
tertia pars nulla possit ratione videri.
horum intestinum quodvis quale esse putandumst?
quid cordis globus aut oculi? quid membra? quid artus?
quantula sunt? praeterea primordia quaeque 120
unde anima atque animi constet natura necessumst?
nonne vides quam sint subtilia quamque minuta?

I use the text and translation here (and elsewhere) of C. Bailey, ed., *T. Lucreti Cari De Rerum Natura Libri Sex* (Oxford, 1947).

cites as proof here the supposedly spontaneous creation of visible *animalia* (in this case worms) from earth which is made muddy after heavy rain.

> The clear facts, which are known for all to see, neither refute this nor fight against it, but rather themselves lead us by the hand and constrain us to believe that, as I say, living things (*animalia*) are begotten of insensible things. Why, we may see worms come forth alive from noisome dung, when the soaked earth has gotten muddiness from immoderate rains (2.867-873).[30]

At 5.795-798 Lucretius refers in more general terms to the creation of *animalia* from the earth, through the influence of rain and solar heat:

> It remains that rightly has the earth won the name of mother, since out of earth all things are produced. And even now many [living things] (*animalia*) spring forth from the earth, formed by the rains and the warm heat of the sun.[31]

Thus, according to Lucretius, the earth possesses the seeds of all things, and the right combination of these invisible *corpora prima* under the particular conditions of rain and sun results in the spontaneous creation of visible, sentient *animalia*. There is a striking parallel, totally in accord with Epicurean physics, between these

30. *...neque id manifesta refutant*
nec contra pugnant, in promptu cognita quae sunt,
sed magis ipsa manu ducunt et credere cogunt
ex insensilibus, quod dico, animalia gigni. 870
quippe videre licet vivos exsistere vermis
stercore de taetro, putorem cum sibi nacta est
intempestivis ex imbribus umida tellus

Cf. here Book 2.891-901 where Lucretius again reiterates that logs and sods made muddy through rains give birth to worms, "because the bodies of matter stirred by the newcomer from their old arrangements are brought into union in the way in which living things (*animalia*) are bound to be begotten (*...quia corpora materiai/antiquis ex ordinibus permota nova re/conciliantur ita ut debent animalia gigni*, 899-901); also, similarly, Book 2.926-30.

31. *linquitur ut merito maternum nomen adepta* 795
terra sit, e terra quoniam sunt cuncta creata.
multaque nunc etiam exsistunt animalia terris
imbribus et calido solis concreta vapore.

Lucretian statements on the spontaneous creation of visible *animalia* from the invisible seeds of earth and his statements on the etiology of epidemic disease (6.1090-1137).

At 6.1093-1096 Lucretius says that there are seeds of many things which are an aid to life and others which cause disease and death. When the latter seeds gather together by chance (*casu ... forte*)[32] in the air, it becomes full of disease (*fit morbidus aer*, 1097). The air may be corrupted in several ways: it is corrupted either because the seeds of disease and pestilence, which he refers to as a force (*vis omnis morborum pestilitasque*), come from without (*extrinsecus*)[33] through the sky, as do clouds and mists (1098-1100), or because such seeds rise up into the air from the earth muddied by excessive rain and sun (*...aut ipsa saepe coorta/de terra surgunt, ubi putorem umida nactast/intempestivis pluviisque et solibus icta*, 1100-1102).[34] Noteworthy here is Lucretius' description of the creation of disease — an invisible force, *vis* — from the seeds of earth as occurring under the very same conditions which are conducive to the creation of *animalia* — namely, earth muddied by excessive moisture and smitten by the heat of the sun.

I have noted above the reasonable possibility, on verbal grounds, that Varro may have misunderstood or misinterpreted Lucretius' passage on *animalia minuta*. Conjecturing further in the same vein, it is not difficult to conceive of Varro as having conflated, with little regard for Epicurean physics, Lucretius' statements regarding the spontaneous creation of *animalia minuta* with those on the spontaneous creation of disease — both creations, according to Lucretius, occurring under similar extrinsic physical conditions characteristic of a swamp, such as muddied earth, excessive moisture, and heat.

Lucretius' comments on the etiology of disease furnish yet another possible source for aspects of Varro's theory. At 6.1125-1130 Lucretius is very specific as to how the *vis morbida*, composed of invisible airborne *corpora prima*, enters the body thereby causing disease. He says:

32. See Phillips (note 15), p. 328, n. 8.

33. See Phillips (note 15), p. 328, n. 9.

34. Note here that verses 1101-02 are repeated almost verbally from 2.872: *putorem cum sibi nacta est/imtempestivis ex imbribus umida tellus.* Cf. also 5.797-98.

> And so this strange destruction and pestilence suddenly falls upon the waters or settles even on the crops or on other food of men or fodder of the flocks; or else this force remains poised in the air itself, and, when we draw in these mingled airs as we breathe, it must needs be that we suck in these plagues with them into our body.[35]

With regard to his pathogenic *animalia quaedam minuta* Varro at *Rust.* 1.12.2 specifies the same means of transmission — air (*per aera*), and the same means of entry into the body in the same order — through the mouth and nostrils (*intus in corpus per os ac nares perveniunt*).

* * * * * * *

In summation, it has been suggested that Varro's theory attributing disease to apparently invisible *animalia quaedam minuta* (*Rust.* 1.12.2) was ignored by his ancient Graeco-Roman successors because of several problems faced by the Roman reader in interpreting his statements. These statements are also inconsistent with Varro's earlier remarks on the etiology of disease (*Rust.* 1.4.3), and these suggest that he should not indeed be regarded as an animalculist without considerable qualification. Finally, given Varro's apparent method of composition and handling of sources, the ambiguities of interpretation and the inconsistency of concept are not unexpected. A possible literary source, from which Varro may have culled excerpts which ultimately inspired his theory of etiology, is the contemporary *De Rerum Natura* of the poet Lucretius. A number of passages from that work can be adduced which reflect implicitly the major characteristics of Varro's *animalia*.

Department of Classics
Tufts University
Medford, Mass. 02155

35. *haec igitur subito clades nova pestilitasque*
aut in aquas cadit aut fruges persidit in ipsas
aut alios hominum pastus pecudumque cibatus,
aut etiam suspensa manet vis aere in ipso
et, cum spirantes mixtas hinc ducimus auras,
illa quoque in corpus pariter sorbere necessest.

Terms for Life in Homer: An Examination of Early Concepts in Psychology

MARIANNE McDONALD

IN Homer there are many more terms for death than for life. As is to be expected, especially from a primitive culture which saw death as totally negative, there are many more paraphrases and euphemisms for death than for life. The ancient Greek view of afterlife in Hades was bleak: at best, a person was a shade of what he had been; at worst, he suffered eternal torments. Elysium was a far cry from Paradise. Death was rarely described in concrete or explicit terms; instead, it was veiled in terms of darkness which covered the eyes as black night or a dark cloud, a hateful fate, or as the end of life, or as a group of physical symptoms: one's limbs were loosened or one — literally — bit the dust in falling.

Scholarship, also, seems to have concentrated on terms for death.[1] Whereas Homer used several terms for life, these are usually translated with the single word "life" and hence are denuded of associations. While death was envisioned as dark, grim, and bitter and as the cessation of movement, life was regarded as bright, potentially joyous, sweet, and rich in activity. Moreover, in Homeric epic life and death are not isolated: life derives meaning and value from the fact that death exists. In this light we can understand why Odysseus rejected immortality: the challenge of death is one thing that makes life worth living. Both Achilles and Odysseus knew the value of immortal fame, the type of immortality which made a man

1. The following works have been most useful on the subject of death: B.C. Dietrich, *Death, Fate and the Gods: The Development of a Religious Idea in Greek Popular Belief and in Homer* (London, 1965); E. Vermeule, *Aspects of Death in Early Greek Art and Poetry* (Berkeley, 1979); W.H. Friedrich, *Verwundung und Tod in der Ilias, AAWG* 38 (1956); B. Moreux, "La nuit, l'ombre et la mort chez Homère," *Phoenix* 25 (1971): 95-105; A. Nehring, "Homer's Description of Syncope," *CP* 42 (1947): 106-21. I regret the unavailability of J. Griffin's book, which has not yet appeared, *Homer on Life and Death* (Oxford). In the meantime the best sources for terms for life in Homer are still B. Snell, *Die Entdeckung des Geistes,* 4th ed. (Göttingen, 1975), H. Fränkel, *Wege und Formen frühgriechischen Denkens* (München, 1955), and J. Böhme, *Die Seele und das Ich im homerischen Epos* (Leipzig, 1929).

greater than a god by virtue of the fact that a mortal paid the price of death.

An investigation of the main terms for life also gives insight into the Homeric view of life. There are several main terms, some words which are regarded as synonymous with life, and various paraphrases that bear close examination. The main terms are: αἰών (*aion*), βίος (bios), βιοτή (bioté), βιόω (bioo), βίοτος (biotos), ζωή (zoe), ζωός (zoos), or ζώς (zos), ζώω (zoo), or ζάω (zao). The following accessory terms also can stand for life: θυμός (thumos), μένος (menos), ψυχή (psyche) and ἦτορ (etor).

In the opinion of Fränkel, Snell, Böhme, and other scholars, Homeric man is described as a composite rather than a whole. In Homer *psyche* does not describe the soul as an emotive totality which expresses man's entire spiritual life as it was conceived in later times. Instead, *psyche* expressed one aspect: a vital force which departs at death and becomes the εἴδωλον (eidolon) in the underworld. The other components of the soul are the physical organs ἦτορ (etor), κῆρ (ker), κραδίη (kradie) and φρένες (phrenes) and the psychical organs of mental and emotional activity, νόος (nous), θυμός (thumos) and ψυχή (psyche). To this list should be added the *menos*, which is a force but not an organ. Of all these only *thumos, menos, psyche,* and *etor* can signify life, not as the complex entity envisioned by moderns, but rather as the specific life forces which comprised the Homeric concept. The soul and the living body are not designated by one general term in Homer, and life also is not so expressed. Each term is used in a special way and sometimes is interchanged with another by analogy, but each makes a specific contribution to a specific composite that no single term expresses.

Kradie, ker (heart), *phrenes* (diaphragm or mind) and *nous* (mind) never stand for life or life force. Each of these represents a passive organ, which can be open to receive impulses rather than initiating them. The *phrenes* and the *nous* are the most intellectual organs, and the latter can stand simply for an idea itself. Where life is concerned, it would seem that physical motion or mental agitation is somehow more involved than calm or objective mental reflection.

In Homer, life is also expressed by metaphors or paraphrases of the concrete term. These are mainly concerned with light, eating, wealth, and activity, both physical and emotional. There are many examples in the first category, e.g., "Light came to him [he revived] and so he avoided the pitiless day [death]," *Il.* 17.615. Another common example of this type is "As long as he lives and looks on the

light of the sun," *Il.* 18.61. These are the opposite of the many euphemisms which equate death with the onset of darkness, e.g., "Darkness covered his eyes," *Il.* 6.11; "Dark [purple] death and harsh fate overpowered his eyes, " *Il.* 5.82-83; or "And dark night covered his eyes," *Il.* 5.310 [death], *Il.* 11.356 [fainting].

The second category of metaphors for life has to do with eating. For example, "...who is mortal and eats the grain of Demeter," *Il.* 13.322. Eating also characterizes existence in one delightful mixed metaphor which compares mortals to leaves, "Poor mortals, who like the leaves, at one time flourish in their brilliance, eating the fruit of the field and then again waste away in death," *Il.* 21.464-66.[2] Again, we see life associated with light. The Greek word for brilliance, ζαφλεγέες (zaphlegees), gives the image of a bright and transient flame burning itself out from its own intensity, perhaps resembling leaves with their autumnal colors.

The value of food for life is such that at times it is equated with life. Thus the word *biotos* means life, a livelihood which can be eaten, e.g., *Od.* 1.160 (this will be explained on page 34). Especially in the *Odyssey*, the banquet setting is one of the dearest occasions to men (e.g., *Od.* 9.1 ff.). One recalls also the value system of the Phaeacians as stated by Alcinous: "We always like the banquet, the lyre and dances, changes of clothes, hot baths, and bed," *Od.* 8.248-9. Even in the *Iliad*, the practical Odysseus repeatedly points out the value of eating, e.g., 19.155 ff., where he says the army must eat, for in food there is "life [μένος (menos)] and strength [ἀλκέ (alke)] which allows one to defend oneself." The analogy of food is carried further by the *aion*, envisioned as "sweet" and "trickling away" like honey (*Od.* 5.152). The *thumos* as life is characterized as "honey-sweet" (e.g., *Il.* 10.495).[3]

Life as "treasure" or "wealth" we see in the term *biotos*, already mentioned. It is this "substance" that the suitors are wasting (cf. also *Od.* 4.90 where in the phrase "gathering much *bioton*," *biotos* means clearly "fortune"). Fortune in Homer is a visible representa-

2. The transiency and fragility of leaves as comparable to man's life is also expressed in the similar passage *Il.* 6.145 ff.

3. Cf. also "eating" one's *thumos* to express intense suffering (*Il.* 6.202) or "consuming" one's own *etor* from indignation (*Od.* 16.92).

tion of a person's honor, τιμή (timé).[4] This worth and honor gives value to life. Thus Achilles lived a short life with *timé* rather than a long one without it. So also Odysseus in refusing immortality preferred, it would seem, mortal *timé*. He wished to be among men, honored by them and enjoying his own property, the visible sign of his honor.

Another obvious alternate expression for life is "to be among men" (*Il.* 18.91) or "among the living" (*Il.* 23.47). Odysseus chooses to be mortal among men (with fame and honor) rather than to have eternal life with a goddess (in obscurity). Men recognize that a person has honor; part of existence among men is recognition.

We also see life expressed in terms of strength or motion, as we observe in Achilles' statement that he will remember Patroclus "as long as I am among the living and have the strength to move my knees."[5] For swift-footed Achilles, existence was equated with his ability to run quickly and prove his physical prowess on the battlefield. For this he earned honor "as long as he was among the living" and in the eyes of those with whom he lived. Thus we see again the complex of existence itself being equated with value in the sight of others.

At times the forces themselves, *aion*, *thumos*, *menos*, *psyche* and *etor*, seem to be metaphors for life. They can be regarded as concrete and are described in terms of liquids, air, and motion. Then again, *thumos*, *menos*, and *etor* can express courage and strength.

Light provides the ambience for existence and its image pervaded Greek poetry throughout the centuries.[6] Food is a tool for existence;

4. See A.W.H. Adkins, *Moral Values and Political Behavior in Ancient Greece* (London, 1972) 14 ff., 29, 62 f.

5. *Il.* 22.387-8. We shall see later *thumos* and *menos* as two terms for life force which provide movement for the limbs. Death often involves relaxation of the limbs: cessation of movement.

6. Examples of the use of light in Greek literature, and scholarly comment thereon, are available in profusion. A few examples are: J. Renders, *Le sentiment de la lumière dans l'oeuvre homerique* (Thèse lic., Louvain, 1939); R. Bultman, "Zur Geschichte der Lichtssymbolik im Altertum," *Philologus* 97 (1948): 1-36; D. Tarrant, "Greek Metaphors of Light," *CQ* 10 (1960): 181-7; and Ch. Mugler, "La lumière et la vision dans la poésie grecque," *REG* 73 (1960): 40-72. Peter Green notes the continuing use of light and shade in Greek poetry in a review of Odysseus Elytis' poems, "The Poet's Greece," *New York Review of Books* 27, no. 11 (1980): 40-44.

an abundance of it shows wealth, or a man's value in other men's eyes, something that he acquired usually as a result of brave acts in which he risked his life. So also motion and emotion can express existence. Whereas pure intellectual activity may equal existence in one culture (*cogito ergo sum*), Homeric man would sooner take feeling, breathing, moving, eating or seeing as proof of life.

Now let us look at the words in Homer which have the primary meaning of life. First of all, *aion* is one of the several nouns with this meaning. Etymologically it can be traced to roots which link it with a word meaning "always" in Greek αἰεί (aiei) and "young" in Latin (*iuvenis*). According to Chantraine the Indo-European root (ai-w-) expresses the vital force or duration.[7]

Whereas, it is true, the primary usage of *aion* in Homer is as "life force," one can also see the beginnings of *aion* as "extent or duration of life." Interestingly enough, the latter examples are all found in the *Iliad*. Could this be the earliest usage? Indeed this word is used more in the *Iliad* (8 times) than in the *Odyssey* (5 times).[8] The same, however, is true for most terms for life, something which is understandable given the respective themes. So also terms and euphemisms for death occur more frequently in the *Iliad* than the *Odyssey*, at a ratio of about two to one.

7. P. Chantraine, *Dictionnaire étymologique de la langue grecque,* 4 vols. (Paris, 1968-77). Chantraine sees the Homeric usage of *aion* as indicating "force vitale" primarily. He sees certain uses in Homer as leading to the meaning "moelle épinière" as it is used later. Onians sees the *aion* as a liquid in the flesh which is identified with sweat and tears and even the cerebrospinal fluid: the "liquid stuff of life" according to Homer and the ancient Greeks; see his *The Origins of European Thought* (New York, 1973) 200 ff. Onians sees the *aion* as wasted in weeping, but so was the *etor* (*Od.* 19.136) and we do not identify it with tears or some life fluid. It is possible that some life fluid is indicated in the case of *aion*, but it is premature (at least from the Homeric context) to identify it with something as specific as spinal fluid, a use which admittedly occurs later (in the *Homeric Hymn to Hermes,* 42, for example). This word comes to mean "seat of life" in the *Homeric Hymns*, "extent of life" in the Greek tragedians, "generation" in Ionic and Attic, and "eternity" in the Greek philosophers.

8. These statistics and the following ones are based on G.L. Prendergast, *A Complete Concordance to the Iliad of Homer*, revised by B. Marzullo (Hildesheim, 1971), and H. Dunbar, *A Complete Concordance to the Odyssey of Homer,* revised by B. Marzullo (Hildesheim, 1971).

There are three clear instances of *aion* meaning "life span" in *Il.* 4.478 and 17.302 where it is described as "brief" and in 9.415 as "long." These qualifiers make sense only if extent were indicated rather than amount. These three passages express a basic concept in the *Iliad*: the death of warriors fighting for honor (Hippothous, Patroclus, and Achilles respectively).[9]

In *Il.* 24.725 we find our picture of short-lived heroes complete: Andromache mourns Hector, saying, "As a youth you are perished from life [*aion*]."[10] Is "life span" indicated, allowing the translation "while yet a young man your life has ended"? Then again, perhaps this phrase is merely a variation of *Il.* 11.342 or 16.861, where the same verb occurs but *thumos* is used instead of *aion*, "perished in respect to life force." A scholiast sees the phrase in 24.725 as "While still a young man, you are cut out from [deprived of] life."[11] The concept of the dead being separated from life makes this instance somewhat parallel to *Il.* 22.58, where a person is "deprived of" life (*aion*; both passages use the genitive of separation). "Perishing from life" shows a man being separated from life, rather than the normal case of life being taken from him or leaving by itself and thereby being separated from the man.[12] Does the meaning of *aion* change with this shift? Possibly it does; it is more natural for a life force to leave a man rather than vice versa; however one can imagine a hasty exit from one's lifetime, particularly when a young person is involved. It is easier to understand this person as

9. We find a third use of this term in the speech of *Il.* 9.411 ff.: Achilles' description of the two fates carrying him to the goal/end of death. In one case the end would come quickly, but fame would be everlasting. In the other case, the man would live but the fame would die.

10. Zenodotus reads *neon* instead of *neos* making the use adverbial and the translation, "*just now* you have perished from life" rather than "as a youth". H. Erbse, *Scholia Graeca in Homeri Iliadem,* I-V (Berlin, 1969-77).

11. Ibid.

12. Monro noted that the more normal case was "life" (*aion*) being taken from a man as in *Il.* 19.27 where it is "slain out" or it leaves of its own accord (*Il.* 16.453). D.B. Monro, *Homer, Iliad,* 4th ed., (Oxford, 1897) 2:430, n. 725.

contained in his lifetime rather than in his life force. An early death is envisioned as a forcible abstraction from life rather than as the gentle seeping away of life which comes with old age.

Aion, on the other hand, as "life force" is the only way this word is used in the *Odyssey*, except that one idea is added. The life force does not suddenly leave — it can ebb or waste away. The concept of patience, waiting, or slow action, characterizes much-enduring Odysseus in contrast to swift-footed Achilles, and it would seem that this also characterizes life in the respective epics. In *Od.* 5.152 *aion* is described as "sweet" and is said to "trickle or ebb away" (like honey or sap?). This is how Odysseus characterizes his life with Calypso. She is no longer sweet to him (153) and accordingly his own sweet life is diminishing. "Do not let sorrow overcome you or let your life [*aion*] waste away," *Od.* 5.160-1.

Penelope is having a comparable experience because her husband is absent. In *Od.* 18.202-4 she prays for a soft death at the hands of Artemis, so that she might no longer waste her life (*aion*) away pining in sorrow. It seems that both in her case and her husband's, sorrow is consuming life. One might make a case that the life span was indicated, but a life force ebbing or being wasted would make the image a more logical metaphor. In each case the span of life is not being reduced; merely the quality of life is such as to weaken the life force. This is the lack of energy which results from depression. Nevertheless one can metaphorically see the life as shortened: the depression was such that Odysseus and Penelope felt that they were "dead-in-life."

In *Od.* 7.224 and 9.523 *aion* seems clearly to be life force. In the first case Odysseus says, "let my life leave" when he sees his home again (cf. *Il.* 16.453). After he wins his return he sees that his life will have had value, and he can be resigned to die (note the euphemism for dying). He obviously does not want to die, but he will give himself as a hostage to the gods if they allow him to accomplish what he wants, namely a successful return.

In *Od.* 9.523 *aion* is coupled with *psyche* as Odysseus tells the Cyclops that he wishes he could deprive him of his *psyche* and *aion* as surely as his eye will not be healed. One cuts short a life span, but takes away a life force. In *Il.* 16.453 *aion* and *psyche* were envisioned as leaving a person and in *Il.* 22.58 there is an idea comparable to *Od.* 9.523: this life force can be taken away as in *Il.* 19.27 it could be "slain out" of a person.

Thus one can see that this term indicates a sustaining life force as opposed to death: the absence of *aion* is death. It is comparable to *psyche* in that it leaves the body when a person dies, but it is different in that when it leaves the body, that body is always dead, not simply in a swoon. It also does not go to Hades as does the *psyche.* In addition, *aion* can mean span of life as inferred by its description as short or long. It never describes the means of life as *biotos* or *zoe* or the way or type of life as *bios* and *biote.* It seems associated with youth and freshness.[13] *Aion* is characterized as sweet, whereas death, θάνατος (thanatos) is bitter, so in this also it is seen as the direct opposite of death. When *aion* trickles away, a person ages and sweet youth disappears.

In Homer there is no other term for life which is qualified by the terms long or short as is *aion.* The only other term which has a temporal limitation is *biotos*: one speaks of its end in *Il.* 7.104 and 16.787 (cf. *Il.* 4.170 discussed below). Nevertheless, as we have seen above, there also can be an end to one's strength or life force but this can be regarded as an end to one's supply rather than to the duration that one has. So also life as existence itself, as opposed to death, can come to an end in death. *Biotos* may simply have been formed by analogy to *thanatos* , as Chantraine has pointed out, with the feminine doublet *biote.* This might argue for it being the simple opposite of *thanatos.* Chantraine further traces the etymological root of *bios* and the related terms to the same root of *bios* and the related terms to the (philological) family *zoo.*[14] In later literature both *zoe* and *biotos* can mean "means of life" in addition to simply "life."

Biotos in Homer has the two basic meanings just mentioned, "life" and "means of life." We have just noted the one case where extent of life may be indicated, but probably this is simply a subcategory of the first meaning. It is interesting that this word, formed by analogy with *thanatos*, appears in the *Iliad* to signify life in opposition to death, often at the very moment of death. Such is the case in the two instances cited above, to which we may add a third: ". . .if you die

13. Ambrosia and nectar are administered through the nostrils by Thetis to protect Patroclus from decay after *aion* has departed (*Il.* 19.38-9). Onians takes this as another argument for the *aion* as the cerebrospinal fluid (p. 205).

14. Chantraine, *Dictionnaire* 1:176-7.

and fill up the portion of life allotted by fate," (*Il.* 4.170). Here we have a euphemism for death after the concrete word for dying. To fill up or complete the fate of life, is close to *Il.* 7.104 and 16.787 where the end of life is reached. In the other case where *biotos* is used to mean life, that life is in danger (13.563: Poseidon makes a spearpoint miss its mark because he begrudged the life of Antilochus).

There are seven occurrences of *biotos* in the *Iliad*, all in the genitive, and thirty-three in the *Odyssey*, in the nominative, genitive and accusative. Four of the uses in the *Iliad* meant "life", as I have just mentioned; and all the others signify "means of life." In *Il.* 5.544 and 6.14 a man is "rich in substance" (*biotos* = "substance"), and so is a home in 14.122.

In the *Odyssey, biotos* means either "life" or "existence," as opposed to death or "means of life." There are no qualifying words which could indicate the meaning "life span." As one might expect, in the *Odyssey biotos* means "property" more than "life," its primary meaning in the *Iliad*. In the *Odyssey* there are 25 instances in which this word means "property" and only five in which it means "life". The *Iliad* is obviously concerned with life-and-death confrontations, and many men are involved, as is usual in war. Odysseus' struggles obviously are ones in which he risks his life, but these confrontations are less frequent and fewer men are involved. The goal here is one's return home rather than the sack of a city. The goal of Odysseus is not destruction but rather the preservation of property. *Biotos* for him is the wealth and substance which is the external sign of *timé*, "honor" which makes life worth living. The suitors threaten this *biotos*: they literally eat it up (*Od.* 13.396, 13.428 and 15.32), and in *Od.* 2.142 when Telemachus says they are destroying it, he uses a word which is usually used in connection with the taking of a life. Food and wealth are here equated with life, and Odysseus will exact life in repayment for this destruction.

The five passages in which *biotos* means life itself in the *Odyssey* are worth examining because the usage is slightly different from that in the *Iliad*. In the *Iliad* we saw that life was defined in the context of imminent death. In the *Odyssey* death is still a threat, but it is farther off and the person whose existence is in question is actually alive and will continue to be alive. Again we see the difference in the heroes: Achilles achieved immortal *timé* at the price of his life; Odysseus secured his *timé* by preservation of this *biotos* at the risk, but not the price, of his life.

In three cases *biotos* signifies the life of a father in his children's eyes, *Od.* 1.287, 2.218 and 5.394. In the remaining two instances in which *biotos* means "life" rather than "property" in the *Odyssey*, a problem has arisen. In both cases the phrase *lilaiomenoi biotoio* is used, and in one case (*Od.* 24.536) there is no question of the meaning: since the men of Ithaca want to save their lives, they flee to the city after Athena has thoroughly terrified them. In *Od.* 12.328, however, the context is less clear: "As long as they [Odysseus' men] had grain and red wine, they held back from the cattle [namely, slaying the sacred cattle of the sun for food] λιλαιόμενοι βιότοιο." Stanford suggests translating *lilaiomenoi biotoio* as "Eager to save their lives." It would seem obvious from the case in *Od.* 24.536 that here also they were eager to save their lives, because they knew that if they slew the cattle of the sun they would be killed. Odysseus, who had learned this from Circe and Tiresias, has warned them and they admit it in *Od.* 12.348-51, where they say they know they may die if they eat the cattle, but the death that Helios sends — presumably drowning — is preferable to starving.

Nevertheless, scholars do not see this interpretation as obvious. Chapman and others translate *lilaiomenoi biotoio* in *Od.* 12.328 in terms of desiring food, as opposed to life in a literal sense, but as Stanford noted, this ignores the parallel in *Od.* 24.536.[15] The issue is further confused by the fact that there are parallels for both uses. In *Od.* 13.31 we find a man desiring food and *lilaiomai* is used with the word for food occurring instead of *biotoio.* So also the parallel in *Od.* 24.536 occurs in a part of the *Odyssey* suspect to some — there were ancient scholars who thought that the *Odyssey* ended at 23.296. However, other uses of *lilaiomenai* indicating the desire to die (*Od.* 15.327) or the desire to slay (*Od.* 22.349) might be parallel to the desire to save one's life. Also, if the men had grain and wine, they would not be hungry, although they might crave the cattle for variety. A much stronger desire would be to save their lives, and this leads to the most natural translation for *lilaiomenoi biotoio* in *Od.* 12.328:

15 W.B. Stanford, *The Odyssey of Homer,* 2nd ed., rpt. with alterations and additions (London, 1965), 1:415. *Biotoio* (*Od.* 12.328) is translated by Chapman "for the gut and life," *Homer,* ed. A. Nicoll, 2nd ed. (London, 1967), 2:467; *lilaiomenoi biotoio* (same citation): "when they were hungry," *Homer, The Odyssey,* trans. S. Butler, revised by M. Wilcock (New York, 1969) 132; "to keep the men up and appease their craving," *The Odyssey, Homer,* trans. R. Fitzgerald (New York, 1961) 220.

"eager to save their lives." The presence of grain and wine would obviate the desire for food necessary for survival, the translation given in Murray's note, "though pining for livelihood."[16]

In each of the uses of *biotos* as "life," we see that it is life in contrast to death. In each case where the living person is described, death is an imminent possibility (in the *Odyssey*) or an actuality (in the *Iliad*). This seems a fitting use of the word, which is modelled on *thanatos*. *Bios* and *biote* on the other hand mean "way of life" and are used only in the *Odyssey*. Once again we see a difference between the epics. Survival is of primary importance in the *Iliad*, where war threatens one's life every day. There is danger in the *Odyssey* also, but there is more time to think about one's way of life. When Odysseus leaves Calypso, he chooses a changed way of life, not simply survival. In fact, his life will be threatened if he leaves, but that is the risk which he is willing to take in order to raise his style of living into one that will give him more *timé* (honor), but less luxury and security.

Bios is used only three times, always in the accusative. In *Od.* 15.491, Odysseus tells Eumaeus that he is leading a good life because he lives in the house of a man who provides well for him, giving him *zoe* and *biotos*, even if that man is absent. *Zoein* joined with *bion*, its cognate accusative, means "to live a life of certain quality," in this case good. So also in *Od.* 18.254 and 19.127, Penelope says that her life (*bios*) would be better and have fairer fame if Odysseus would return and take care of it. Once again we observe that it is the quality of life which is indicated.

Here we see two essentials for a good life: it is *agathos* (good) if it has security of food (*Od.* 15.491) and it is *kalos* (fair) if one has fair fame, which for a woman is insured by the presence of her husband and his taking care of her life. Clytemnestra, on the other hand, has brought ill fame on women for all time by her act against her husband. Her reputation is in contrast to that of Penelope, whom Agamemnon sees as having everlasting fame because of her virtue (*Od.* 24.191-202). In Homeric epics food and fair fame are two essentials for the good life.

Bioté occurs only once, in the *Odyssey* (4.565) and it describes the life which Menelaus and Helen will enjoy in the Elysian plain, having

16. Homer, *The Odyssey*, Loeb trans. by A.T. Murray (London, 1919), 1:455, n. 1.

bypassed death because of divine connections, because Zeus was the father of Helen and thus the father-in-law of Menelaus. Life there is described as easiest for men: snow, storm, and rain are absent and there is a west wind with its cool breezes which refreshes (literally, revives: *anapsychein).* Good weather is essential for the good life of Mediterranean man, who is dependent on it for his crops and for his ocean trade. This good weather is so important that even the afterlife is envisioned as providing it.

Bioo occurs three times in the *Iliad*, as infinitive and imperative, and means to "live, exist" in contrast to "die." It also occurs in each instance with a word for dying: in *Il.* 10.174 *bionai* ("to live") is opposed to "baleful destruction," in *Il.* 15.511 to "die" and in *Il.* 8.429 the imperative is opposed to "perish." In each case it is the Achaeans who are envisioned in a life-and-death struggle. The use of the aorist may indicate the instant when life or death is decided. Typically the context shifts again in the *Odyssey*, where the term occurs twice, once intransitively — the only case in the *Iliad* — and once transitively. In the first case, *Od.* 14.359, Odysseus says that it must be his fate (*aisa*) to live (*bionai*) because the gods have brought him to Ithaca, to the farm of a man with understanding. In *Od.* 8.468 Odysseus tells Nausicaa that he will pray to her every day if he reaches Ithaca, and honor her as a goddess because "you have saved my life," ἐβιώσαο (ebiosao). Death is still a threat in the *Odyssey*, but the emphasis tends to be placed on the fact that death has been overcome.

In its Homeric use, *bioo* shows that it is related to *biotos* as "existence" more than *bios* or *bioté*, which mean "way of life." In later literature *bioo* comes to mean "live in such a way" as does *zoo* in Homer.

In contrast to the verb *bioo*, *zoe* means only "livelihood" or "property" in Homer. It occurs three times and then only in the *Odyssey*, the epic which also uses *biotos* with this primary meaning. It is probable that Tyrtaeus (15.5) was the first in Greek literature to use *zoe* as "life". The word may have had this meaning earlier, but Homer did not use it that way in any of the extant writings attributed to him.

Zoe may signify in *Od.* 14.96 where Eumaeus speaks of it as "endless," something necessary for suitors with insatiable appetites, but it may be equivalent to the wealth described in 99. In *Od.* 14.208, this term means more than food, because it is what sons divide as their inheritance, thus "property." The same meaning holds for *biotos* where it is called "suiting the spirit" and "much".

The verb *zoein* does not occur in the aorist in Homer, in contrast to *bionai*, the aorist infinitive of *bioo.* We noted that the latter meant "to exist," usually just at the instant when life was threatened; hence the use of the aorist is appropriate, since it can indicate a singular act or instantaneous occurrence. *Zoein*, on the other hand, refers to existence in a more general sense, not merely at the moment of death; it also refers to living in a certain way. Its participle can also indicate the class of living men, specific men who are alive or men living in a certain way. The adjective (*zoon*) can apply to an animal or a plant as well as a human being. *Bioo* has no such adjective and does not occur in the participial form in Homer.

There are twenty uses of the verb *zoo* in the *Iliad* and thirty-seven of the adjective; in the *Odyssey* there are thirty-three appearances of the verb and twenty-four of the adjective. *Zoein* usually means "to be alive," but it can also mean "to live in a certain way."[17] There are only two instances in the *Iliad* in which the finite verb means "to live in such a way" and two instances of the participle (*Il.* 5.887 and 6.138: of the gods). In *Il.* 24.526 and 19.335, man is described: the human race in the former instance and an individual, Peleus, in the latter. In the former, Achilles explains to Priam that such is the life that the gods have woven for weak mortals, namely one of sorrow, while the gods themselves are without care and live a life of ease (*reia zoontes*). Peleus in *Il.* 19.335 is an example of suffering man: he barely lives and he is burdened with old age. His only hope in life comes when he receives word that his son may be alive (*Il.* 24.490), an example of *zos* as a participle which means "living." All the remaining participles (eight) are so used, as is the finite verb (eight).

17. Cunliffe recognizes these two meanings for the verb, but not for the participle; yet they are valid for both. R.J. Cunliffe, *A Lexicon of the Homeric Dialect* (London, 1924) 177.

Zoontes, the participle, is not used in the *Iliad* to indicate the class of living human beings, but rather is used specifically to refer to particular groups of men. It is only in the *Odyssey* that it is used collectively to denote the human race — only twice, with superlatives.

Both the participle and the finite verb are qualified four times in the *Iliad* with the euphemism for life involving sight or light, while there are seven such uses in the *Odyssey*. In *Il.* 18.61 and 442 the phrase is "while yet he lives and looks on the sun." In both cases Thetis describes Achilles and expands her statement to say that as long as he lives he will suffer, another illustration of *Il.* 24.526 (cf. *Il.* 1.88). In *Il.* 18.10, Achilles remembers what his mother told him, that while he was alive (*zoontos emeio*) the best of the Myrmidons (Patroclus) would leave the light of the sun (slain) at the hands of the Trojans. Here we see the implementation of the sorrow he was to suffer. Again we see that life exists in sight and looking on the light of the sun: death, on the other hand, is the departure from that sight and light.

The absolute use of the adjective as a substantive is limited to two examples in the *Iliad*, 23.47 and 22.388. The remaining thirty-four (of thirty-eight, four have just been cited, three of which are absolute) uses of *zoos* in the *Iliad* are adjectival ones, to denote a living being, with the emphasis on simple existence. Some uses are from the perspective of those who survive the person so described, e.g. *Il.* 12.10, "While Hector was still alive." Sometimes the notion is expanded to state explicitly that the person is now dead, e.g., *Il.* 17.478: Patroclus was like the gods in wisdom while still alive (*zoos eon*), but now death and fate have found him. Sometimes it is the fate of death (*Il.* 24.750). Parallels are drawn between Hector and Patroclus in the use of these phrases and one thinks of the additional parallel of Achilles, another hero who is alive but will soon be overcome by death. One can extend this parallel further to the entire human race (*zooi*), who must inevitably face the fate of death, as Hector says explicitly to Andromache (*Il.* 6.486-9).

Zoos appears four times in the *Iliad* coupled with a word or phrase indicating movement or the strength to perform movement. We saw this in the phrase in *Il.* 22.388, "as long as I am alive and able to move my knees." It also occurs in the phrases in *Il.* 5.515 and 7.308. In *Il.* 5.515 the Trojans happily see Aeneas coming toward them alive (*zoon*), safe and sound and having valiant strength (*menos esthlon*). Each qualifier expands the idea of life itself, so that it includes the strength which enables one to be alive. The same

phrase applies to Hector in *Il.* 7.308, however without his explicitly having "valiant strength." In this instance he is alive because he has escaped the "strength" (*menos*) of Ajax (*Il.* 7.309).[18]

In *Il.* 12.203 and 221 we see motion again joined with *zoon,* which is now applied to an animal, a snake which is struggling in the talons of an eagle. This is the only word for life, aside from the more general *thumos* and rarely *psyche*, which Homer uses in connection with an animal. In the fifth century *zoon* was used absolutely to indicate "animal," but we can see the adjectival application as early as the *Iliad* (cf. *Il.* 21.132: "to sacrifice living horses"). *Zoos* never applies to an animal in the *Odyssey*.

There are more uses of the verb *zoo* in the *Odyssey* than in the *Iliad;* accordingly there are also more instances in which the verb has the meaning "to live in such a way," namely ten times out of thirty-three in the *Odyssey* vs. four out of twenty in the *Iliad.* Only four out of the ten uses with this meaning in the *Odyssey* are in the participial form rather than the finite verb or infinitive. In the *Iliad* in the two passages in which the participles were used they described living in a particular way, namely the life of the gods, one in a general and positive way (*Il.* 6.138: *reia zoontes*, "living a life of ease") and one negatively of a specific goddess (*Il.* 5.887, "living without strength").

We find the "living a life of ease" use again in the *Odyssey* (4.805 and 5.122), again applied to the gods. What is new in the *Odyssey*, however, is that the participle is now used to describe men in a certain way, namely without accomplishing a certain end: Leiodes the soothsayer says to the suitors that it would be better to die rather than to live on in failure, 21.155; the prophecy is then brought to fulfillment in a gruesome way. The gods live a life of ease, easily accomplishing what they wish, but man suffers and can live a life of continual failure: such is what one sees in comparing the life of divine and human beings in these epics. But when human success occurs, it is thereby the more valuable because of its difficulty.

18. Sometimes strength can stand for a person himself; one speaks of the *menos Alkinooio* (*Od.* 8.423) and *bie Herakleeie* (*Il.* 2.658), both words indicating strength joined with the names of the people they stand for: Alcinous and Heracles. Strength adds value to the life of the Homeric hero to the point where it can be identified with that hero. A life without strength was not regarded as a life worth living: strength enables one to win honor and gain fame.

When the finite form of *zoo* is used in the *Odyssey* to mean "live in such a way," the life described is mainly that of a man who is well-off in a materialistic sense. Such is also characterized as good in 15.491 (*agathon bion*) and this is the life which Eumaeus leads whereby he is provided food and drink by a kindly master, albeit he is *in absentia*. Odysseus says of himself that he has slaves and much else with which men live well (*eu zoousi*) and are called wealthy (*Od.* 17.423 and 19.79). So also it seems that Odysseus is wishing the Phaeacians a life of wealth which they can then pass on to their children when he says "May the gods grant to you to live in prosperity and may each pass on to his children the possessions he has in his halls and the reward that the people have accorded him" (*Od.* 7.148-50).

In 22.213ff. the suitors try to dissuade Mentor from bringing aid to Odysseus. They say that if he does bring aid they will not allow his sons to live in his halls (*zoein en megaroisin*). Thus *zoein* here means to live in a certain way, namely in the halls of one's father — not in exile — and enjoying one's inheritance.

The only instance in which the infinitive is used in a context that means "to live well" in some way which is not obviously materialistic is in *Od.* 24.426 ff. when Eupeithes the father of Antinous addresses the other fathers of the slain suitors. He says that life without vengeance would not be sweet (24.435-6), and in such a case he would rather die as quickly as possible and be numbered among the dead (cf. *Il.* 18.91 where "to be numbered among the living" meant "to be alive"). He says that failure to exact vengeance would be a reproach which future generations could level against them; hence their immortal fame would be one for cowardice, something to be avoided as much as Achilles' immortal fame for courage was to be pursued.

Thus we see that a good life is one wherein material needs are satisfied and in which a person has the physical strength and courage as well as the reputation for possessing them. A bad life is one in which a person endures physical want, a bad reputation or sorrows because of the loss of someone who was close, with whom one had the relation the Greeks called *philia*. A variation of the latter is *Od.* 15.353: Odysseus is told that Laertes, his father, still lives (*eti zoei*) but is praying that his life (*thumos*) will waste away from his limbs because he sorrows so much for his son. Odysseus' mother had already perished from this sorrow (*Od.* 11.202-3).

All the other uses of *zoo* are with the meaning of "exist." This can be determined by the context which generally opposes the

notion of existence to death, e.g., ". . . either whether he still lives [*zoei*] and looks on the light of the sun or has already died and is in the halls of Hades," (*Od.* 4.833-4). Most of these instances are based on questions of Odysseus' existence. He himself inquires about his parents in *Od.* 15.349-50, using virtually the same words.

There are two uses in which *zoein* means to continue to live, or rather to avoid death in a certain instance: *Od.* 13.360 in a prayer where Odysseus vows gifts if Athena allows him to live and 16.388, where Antinous says, "if you choose that he live," speaking of Telemachus. Simple existence is also indicated in *Od.* 17.391.

In another category we find the phrase "never or always will such and such happen as long as I am alive." We see this with the finite *zoo* in *Od.* 3.354, where Nestor in his usual lengthy way says something which could be said much more briefly. He says that as long as he lives and has children . . . Odysseus' son will not lie on a deck of a ship [but will be his guest]. We will find the participle used in *Od.* 16.439 when Eurymachus says, "no one will lay hands on Telemachus while I live and am able to see on the earth." In this case one would presume that sight does not enable him merely to look on the light of the sun, but rather to see what is going on, so that he can protect Telemachus.

The adjective *zoos* in the Odyssey is used four times collectively, three times in the plural and once in the singular. Odysseus' mother asks how he could come, a living man (*zoos*), to the lower regions, because it is difficult for the living (*zooisin*) to see these realms (*Od.* 11.156). Here sight is again equated with being in a place, but the usual place where the living can see is earth, not Hades.

On *Od.* 10.52 and 14.487 the phrase "be among the living" (*zooisi meteinai*) is used in a context whereby it means "continue to live." In the first case Odysseus decides not to throw himself from the ship in despair and so kill himself, but to be patient and endure in silence and remain among the living. In the latter the false Odysseus tells the true Odysseus that he will "no longer be among the living" unless he gets a coat. In both cases physical survival is indicated.

In *Od.* 23.187 Odysseus says, referring to the bed he had made around a tree, "no man is alive" (*ou ken tis zoos brotos*) who can move that bed easily. Here the sense is general but the adjective is singular.

Simple existence is the main fact denoted by the adjective *zoos* in the *Odyssey*. In most of these cases there is some direct reference to death, e.g., *Od.* 1.196-7: "He is not yet dead . . . but is still alive

somewhere." In one case Elpenor makes the contrast from the fact that he is dead and is making a request that pertains to the time when he was alive, "Put the oar with which I rowed while living on my grave" (*Od.* 11.78). The genitive of the adjective occurs in contexts of inquiry about Odysseus, whether he is dead or alive. A comparable use is of the accusative "to find a person alive" (*Od.* 3.256, 4.546 and 24.284).

As in the *Iliad*, we have instances of taking people alive as prisoners (*Od.* 14.272 and 17.441). In the *Odyssey*, the purpose is to take a prisoner alive to work as a slave; in the *Iliad*, a prisoner might also be taken as a living sacrifice (*Il.* 21.27)

In the *Odyssey* we also see the use of *zoos* in an oath, cf. *Il.* 22.388. In *Od.* 11.349 Alcinous says he will support what Arete has said as long as he lives as lord of the Phaeacians (*zoos . . . anasso*). One might take this as an example of *zoos* used to indicate more than simple existence.

There is one passage in which *zoous* describes living beings held by the life-supporting earth (*phusizoos aia*) in the same way that others are held when they are dead (*Od.* 11.301, cf. *Il.* 3.243 and 21.63). Both the first examples apply to Castor and Pollux, who live and die alternately each day. *Il.* 21.63 is more straightforward and speaks of the life-supporting earth holding a man once he is dead. It is of interest also that earth is life-supporting when in fact it restrains a person from returning to life. Nevertheless we have seen many instances in which terms for life are used in connection with the instant of death, or are employed retrospectively by a person who has died. In such cases life as existence is quite clearly defined by its opposite.

Among the twenty-four uses of the adjective in the *Odyssey* there are three other instances in which the quality of life is added to the concept of a simple existence. In *Od.* 22.177 Melanthius is killed in such a way that during his final hours he will suffer severe pain. Here again a bad way to be alive is to suffer physical distress.

Another bad way to live is to have a bad reputation; we have already mentioned this notion. In *Od.* 19.328 ff. Penelope says that men have a short life (*minunthadioi*, the term used to characterize the life — *aion* — of Achilles). If a person is harsh, lacks feeling, and knows such deeds, all men wish him pains and suffering while he is alive and when he is dead they scoff at him. She goes on to say that if one is blamelessly excellent and knows deeds which can be so characterized, that person wins fair fame. Here we see a person on

whom curses and physical pains have been invoked during his lifetime and an immortal bad reputation thereafter. We saw a comparable use of the participle in *Od.* 24.436, where the father of Antinous says that vengeance must be exacted because of one's future reputation. Again, life is indeed short but fame is long.[19]

It might be possible to say that Achilles refutes this doctrine in the next case, in which *zoon* describes a life with a certain quality. Odysseus says to Achilles in Hades, while you were alive we honored you like a god and now this honor continues in Hades, where you rule as lord over the dead (*Od.* 11.482 ff.). This is the honor and fair reputation which in the passages just cited give value to life. But Achilles replies that to be alive — literally, "be on earth" or "attached to the earth as a serf" — he would serve a portionless man, who does not have much livelihood (*biotos*), rather than be lord over all the dead. Achilles seems to be saying that he would pay any price to be alive. Nevertheless, he is not devaluing honor: death has merely given him a clear perspective and appreciation of life. Death is dark and dismal and the *psyche* is a pale strengthless reflection of a living man. One's physical existence in a bright world was of primary importance to the Homeric man, and honor added to its value.

The next term to be investigated, *psyche*, has been a popular one in critical studies.[20] Snell sees it as a *Seelenorgan*, whose function is to

19. Cf. Virgil, *Aeneid: Stat sua cuique dies, breve et inreparabile tempus/omnibus est vitae; sed famam extendere factis,/hoc virtutis opus.* — "Each person has his day, a brief and irreplaceable time is life for everyone; but to extend one's fame by one's deeds, this is the work of virtue" (10.467-9).

20. Snell, Fränkel and Böhme have already been cited in n. 1; see also Warden, "*Psyche* in Homeric Death Descriptions," *Phoenix* 25 (1971) and Onians, op. cit. We should add E. Rohde's *Psyche: Seelenkult und Unsterblichkeitsglaube der Griechen* (Darmstadt, 1961); O. Regenbogen, "*Daimonion Psyches Phos* (Erwin Rohdes *Psyche* und die neuere Kritik). Ein Beitrag zum homerischen Seelenglauben," *Synopsis, Festg. für A. Weber* (Heidelberg, 1948) 361-96; L. Moulinier, "Psyche. Zum homerischen Seelenglauben," *Universitas* 21 (1966): 1077-92; T.C. Hutton, "The Soul in Homer," *TAPhA* (1931) xxxviii; F.L.M. Santee, "The Soul in Homer and Virgil," *TAPhA* (1930) xxxii; E. Bickel, "Die verschiedenen Seelenvorstellungen im homerischen Volksepos," *Neue Jahrbücher für Paedagogik* (1930) 179-88; W.B. Stanford, "Ghosts and Apparitions in Homer, Aeschylus and Shakespeare," *Hermathena* 56 (1940): 84-92.

give man life.[21] The etymology of *psyche* relates it to an Indo-European root meaning "breath."[22] The Greek verb *psycho* is gradually replaced by *pneo* (*pneuma*); *psychos* and *psychros* ("cool" and "cold") belong to the same family. One thinks of a cooling and life-restoring breeze such as is felt in Elysium: "There Ocean sends up constant cooling blasts of the shrill blowing west wind to bring reviving refreshment [*anapsychein*] to men," (*Od.* 4.566-8, cf. also *Il.* 5.697-8).

Psyche can be classified according to location. There are two locations: (1) inside the body — the breath or spirit in life as (a) a possession in life which is risked, (b) life force or breath at the moment of death, or during death-wish, or while leaving the body, and (c) while leaving the body during a faint. The other location is outside the body — the breath or spirit in death (a ghost).

In each of these cases we see *psyche* as a life-force or breath from the perspective of death, either when death is threatened or has occurred. Even in the case of a faint, life is considered to be in danger. In no cases then does *psyche* mean span of life as we saw with *aion,* nor does it refer to life as being of a certain quality, which was the trait indicated by *bios* and the family of *zoo* terms.

The nine uses of *biotos* as "life" rather than "means of life" come closest to this use of *psyche.* In three of the nine a qualifier is used, signifying end or fate of life. In two cases it is a subject of inquiry. In two it is endangered — by a spear and sickness — and in two other cases its salvation is desired. *Biotos* is not regarded as the personal possession that a person can risk in battle, as is the case with *psyche. Biotos* does not seem to be a personal life force as *psyche*, but rather describes the objective fact of existence: function rather than force. The *biotos* is never seen flying off to Hades, or even leaving the body, as happens with the *psyche.* The *biotos* simply comes to an end. *Psyche* is also used in more emotive contexts than *biotos*: for example, it is the term used when one person threatens the life of another; see *Od.* 9.523-5.

21. Review of Böhme's *Die Seele und das Ich im homerischen Epos,* in *Gnomon* (1931), p. 80.

22. H. Frisk, *Griechisches etymologisches Wörterbuch* (Heidelberg, 1970), 2.1141-2.

The uses of *psyche* in Homer are given in the accompanying table. The 34 instances listed under Category II for the *Odyssey* represent a plethora of ghosts, to be expected in a visit to the underworld.

Uses of the Term *Psyche*

	Iliad	*Odyssey*
Ia	6	5
b	17	9
c	2	0*
II	6	34

**psyche* = fainting

In the *Iliad* the most frequent use of *psyche* is as a life force departing from the body (I b). *Psychai* can go to Hades by themselves at the moment of death (*Il.* 7.330) or they can be sent there (*Il.* 1.3). One can also say that one "dies" in respect to one's *psyche* (e.g. *Il.* 13.763, which use is parallel to *thumos* (*Il.* 16.861), *etor* (*Il.* 5.250) and *menos/thumos* (*Il.* 8.358): one perishes in respect to one's life force. Then again, as the *menos* is released from the body at death (*Il.* 17.298), so is the *psyche* in connection with the *menos* (*Il.* 5.296). We have seen earlier that it departs with the *aion* (*Il.* 16.453). Sometimes these terms are used in a context which shows that only one term is appropriate, but sometimes they are used interchangeably, mainly to denote life departing at the moment of death.

We see such a use when Odysseus says that he wishes that he could send Polyphemus bereft of his *psyche* and *aion* to Hades as surely as his father, Poseidon, will not heal his eye (*Od.* 9.523-5). Obviously from what we know of the *psyche*, it is just this part of man which goes to Hades, in contrast with the *aion*, which leaves at death and never accompanies the ghost that goes to Hades. In *Od.* 9.523-5, *psyche* seems to take on the same meaning as *aion*, namely as a general life force, comparable also to *thumos*, *menos* and *etor*.

Psyche (as in Category I b) is what a person has at stake when he risks his life. When Achilles is temporarily questioning the heroic code in *Il.* 9, when offers are being made to him, he observes in effect that all the wealth of Ilium is not worth human life (*psyche*: *Il.* 9.401); for whereas wealth may be acquired or reacquired when lost as booty

or by seizure, this is not true of a human life once it has passed the barrier of a man's teeth (*Il.* 9.408-9). Achilles knows the value of human life and will know it even better after death. But the knowledge of this value does not alter the fate that finally bears him to his death (*Il.* 9.411), a death fully compatible with the heroic code, although a second fate is possible. At first glance this alternative fate, a long life without fame, is more in accord with statements which say that no wealth is worth human life. But what of honor and fame? In both this instance and the one in the underworld, Achilles uses examples which show that he would give up wealth for life. But would he also give up immortal fame?

Another context which shows us a life being risked is *Il.* 21.562: Agenor debates with his *thumos* whether to flee Achilles or to stand and fight. One argument which reassures him is that Achilles also is human: he has one life (*psyche*) and men think him mortal (*thnetos*), although Zeus indeed gives him glory (*kudos*: *Il.* 21.569-70). It is this glory, and particularly the glory which will come from avenging a friend's death, that will lead to Achilles' fate: a brief life but immortal fame. If he had not avenged the death of Patroclus, his ignominy would have been immortal (cf. *Od.* 24.426 ff.). In *Il.* 21.569 life is in the context of death as confirmed by the word mortal. When Agenor and Achilles fight, each will risk only one life, a risk shared by all mortals.

So again in *Il.* 22.161 we see a life at stake, that of Hector. Achilles and Hector are running, with Hector's life as the prize. In *Il.* 22.338 Hector appeals to Achilles emotionally and begs him by his life (*psyche*), knees, and parents not to let him be eaten by the dogs. One would not appeal to a *bios*; *psyche* has the proper emotive force.

Another use for *psyche* is in the context of fainting. There are two such instances in the *Iliad* and none in the *Odyssey*. In the first example, Sarpedon's *psyche* left him after he was seriously wounded and a mist was shed over his eyes (*Il.* 5.696). But he breathed again as the breeze of the North wind blowing on him revived him "who had breathed forth his *thumos*" (*Il.* 5.698). This passage and its common translation as just given so disturbed Nehring that he translated *kakos kekapheota thumon* as "weak in the *thumos*."[23] He states that no *apo* appears in this phrase to justify the translation "breathe forth."

23. Nehring, "Homer's Description of Syncope," p.116.

Couldn't *kakos* here act as *apo*, as Eustathius had thought?[24] What of *Il.* 16.468: *thumon aïsthon*? There is no *apo*, but *aïsthon* clearly means "breathing out" — one's life spirit at the moment of death.

Another instance of fainting is in *Il.* 22.466 ff.: dark night covered Andromache's eyes and she fell backward as she breathed out her spirit (*apo de psychen ekapusse*). One might consider this is a sufficient parallel to the example just cited given the parallel contexts, hence a similar translation would be in order. In *Il.* 22.475 Andromache is said to have breathed again and gathered her *thumos* in her *phren*, namely her spirit or life breath back into her diaphragm, a seat of energy. In both cases the *thumos* is concerned, in addition to the *psyche*. The *thumos* can be the organ of physical energy in life, but in this case it is the force itself which returns as a person revives. The *thumos* is used here, in a natural way, to denote revival, rather than the return of the *psyche*. The *psyche* is noted especially in its absence, which is indicative mainly of death whereas the *thumos* is noted in its presence and is very active with the concrete functions in life. The main function of the *psyche* is to depart at death; it does not invigorate life as does the *thumos* although it may be considered synonymous with life.[25] The *psyche* is also the preferred term for specifically human life, although in *Od.* 14.426 when Eumaeus kills a boar, its *psyche* is said to leave. Usually it is the *thumos* which leaves animals at death.[26]

The next category is *psyche* as "ghost," by far the most predominant use of this term in the *Odyssey*. First, let us observe the nature of the *psyche* as it departs. It can leave from a wound (*Il.* 14.518), the mouth, or the nose as it is breathed forth (*Il.* 5.696; *Il.* 22.467), from the limbs (*Il.* 16.856), and from the throat, whence the passage is easiest (*Il.* 22.325). The last example shows us the close link between this term and breath. As Snell has noted, this is the primary

24. Ibid., p. 114.

25. Warden, op. cit., p.103, sees the "Totengeist" meaning as the original one leading to the *psyche* as used in death descriptions.

26. "The *psyche* of men flies away (in death), but one did not want to ascribe a soul to an animal, so one found a *thumos* for them which leaves them when they die." Snell, *Entdeckung*, p. 21.

usage; departure (from a wound, for instance) is secondary.[27] So also when the *psyche* departs from the limbs (*Il.* 16.856), it is being interchanged there with *thumos*.[28] The ghost is described as a shadow or dream (*Od.* 11.207), or smoke (*Il.* 23.100). It squeaks, rather like a bat (*Od.* 24.5). It moans as it flies to Hades (*Il.* 16.857 and 22.363) or it can make a wondrous cry (*Od.* 11.43). It is said to lack *phrenes* (*Il.* 23.104, where a special dispensation has been made for Teiresias). *Phrenes* cannot simply mean "intelligence" here: quite a few ghosts speak with intelligence, or certainly can reason, even without drinking blood, as is shown by the case of Patroclus, Achilles, Ajax, and the suitors at the end of the *Odyssey*. Perhaps the *phrenes* that the ghosts lack is simply the physical organ or source of intelligence and energy, the diaphragm as it was in life. The only ability that Teiresias has that the other ghosts lack is his ability to see the future. Perhaps his continued possession of *phrenes* in the underworld reinforces his reason, so that he does not have to drink blood in order to make intelligent comments — the *phrenes* have been closely associated with blood, hence they can be called black, e.g. *Il.* 1.103).[29] Could the *phrenes* also help foresight?

The *psychai* in Hades, the *eidola* ("ghostly shades") lead an aimless life, well characterized by the flitting of a bat (*Od.* 24.6). They are pale shades of the humans they once were; and the distaste they feel is corroborated by those asked and even those unasked, such as, Patroclus, Anticleia, Achilles and Elpenor. The *psyche* bereft of *phrenes, thumos, menos, etor, kradie* and the bodily setting is an unhappy ghost. For the Homeric Greek life needs all its components to be worth living; activity in death is a poor substitute.

27. Ibid., p. 19.

28. Ibid., pp. 20-1. Warden, op. cit., p. 96, n. 5, congratulates Snell for his interpretation of this passage but misunderstands the reason. He asserts that Snell's argument that *rethe* means "face" in this context seems convincing. That was Dionysios Thrax's conclusion based on a scholiast's comment on this passage, not Snell's (*Entdeckung,* p.20). Snell saw here merely a confusion between *thumos* and *psyche*; thus the *psyche* here is said to leave the limbs by analogy with *thumos,* although it usually leaves the mouth.

29. Cf. F.M. Combellack, "Agamemnon's Black Heart," *Grazer Beiträge* 55 (1975): 81-7.

There is a consistent picture of the *psyche* in both the *Iliad* and the *Odyssey*. This applies also to the uses of *psyche* as the life force which leaves the body. In *psyche* as a life force that is risked (I a) there is a new use — that of self-preservation. Now in *Od.* 9.423 we find Odysseus weaving plans to save his life "as a man will when it is a matter of life." So also in *Od.* 1.5 he strives to save his own life and gain the return of his comrades; this is a new theme of the *Odyssey*. Whereas in the *Iliad* the risk of one's life for the sake of glory was routine, in the *Odyssey* there is a shift of emphasis: self-preservation is of primary importance and a new source of glory and the cleverness to figure out one's salvation is emphasized. We see this even in the use of the term *psyche*, which now is something to be saved by cunning whereas in the *Iliad* preservation of the *psyche* had never been a primary goal. In the *Odyssey* risks are still taken but they are calculated risks.

The next term, *thumos*, is different from *psyche* in that life is only one of its meanings. It is located in the *phresi* (midriff: *Il.* 13.487) or *stethessin* (breast: *Il.* 9.703) and the *ker* (heart) can be located in it (*Il.* 6.524). In general it is the organ which is the seat of emotion or *Regung* as Snell puts it.[30] It has probably the widest range of meaning in Homer. It can cover anger, madness, suffering, indifference, endurance, patience, boredom, distaste, fear, gentleness, cruelty, shyness, pride, stubbornness, courage, madness, pleasure, respect, contentment, love, hate, desire, and expectation — virtually the gamut of pleasant and unpleasant emotions — in addition to its function as a source of motion and thus of energy or strength and finally life itself. It is the organ which incites a person to action. It can influence the intellect by providing emotional intuition. The *thumos* can indicate the organ, its function, or the act, impulse, or idea itself (e.g., *Od.* 9.302: "another *thumos* held me back"). It is also the power which provides motion to the limbs; hence it would leave the body in death. It is this physical function primarily that one can interpret as life, not as "lifetime" as *biotos* or even "life" per se like *bios,* but rather the "life force" which provides motion to the body.

Thumos relates etymologically to *dhuma* — from which Latin *fumus* is derived. Chantraine thinks it would be more reasonable to relate *thumos* to *thuo*, "leap forward with fury" rather than to *thumiao*, "make

30. Snell, *Entdeckung,* p. 21; see also p. 25.

smoke."[31] Interestingly, both attributes can be detected in the contexts in which it appears. *Thumos* is a source of motion which is breathed out during fainting or death.

Thumos occurs frequently in Homer — 424 times in the *Iliad* and 322 in the *Odyssey*. The greatest use for this term is in the expression of emotions. In the *Iliad* we find 62 cases in which *thumos* clearly expresses life force, e.g. when the person is in a weakened condition and his *thumos* is diminished or when the *thumos* actually leaves the body permanently in death. There are 23 such instances in the *Odyssey*. These proportions are reversed in the case of *psyche*, which occurs more frequently in the *Odyssey*, most often as "ghost". There are many more death scenes in the *Iliad*, but in the *Odyssey* there is direct contact with the underworld, hence the *Iliad* contains more terms associated with dying and there are more for ghosts in the *Odyssey*.

It is found also that the meaning of *thumos* varies with its inflection. In the dative case it most often indicates an emotion. In the *Iliad,* it is most often used as "life force" in the accusative case. Here we observe another shift in usage. In the *Odyssey* the term in the accusative case is used 30 times in an intellectual context, 16 times to denote suffering and only 11 times to denote life. Again the shift is logical, given the fact that Odysseus is the paradigm of the man of reason who also knows how to endure suffering; see *Od.* 1.3-4 and the epithets *polutropos*, "man of many turnings" and *polutlas*, "man of much endurance." This contrasts with Achilles, the paradigmatic warrior, the one who takes many lives. *Thumos* shows this shift in that it expresses life force mostly in the *Iliad* and an intellectual force in the *Odyssey*, reflecting the shift in the main characters.

In both the *Iliad* and the *Odyssey* the *thumos* can be slain out of a body, or can leave a body, or can be weakened in consequence of fainting or exhaustion. When it leaves the body it can be breathed out (*Il.* 4.524), or can fly away (*Il.* 16.469), or waste away (*Il.* 16.540). When it is breathed out it has presumably issued via the lungs. It also can leave from the bones (*Il.* 12.386) or the limbs (*Il.* 13.671). It can be destroyed (*Il.* 1.205), taken away (*Il.* 5.346), or subdued (*Il.* 14.439: like a wild animal). When the *thumos* returns, it is regathered in the *phren* ("midriff": *Il.* 22.475) or simply regathered

31. Chantraine, *Dictionnaire* 2:446.

(*Il.* 15.240). A faint can also be expressed by a lack of *thumos* (*Il.* 3.294 and 20.472: in both cases death immediately follows).

In one case as a person revives the *thumos* is described as flowing back into his breast (*Il.* 4.152). Does this flow make the *thumos* comparable to air or blood? It flows back when Agamemnon recognizes that his wound is not fatal. Since it is the recognition rather than the fact which revives him, the incident might be interpreted as a revival of "spirit" rather than "life spirit". Nevertheless it is included in the foregoing statistic as "life force."

The term which means "flowing back" seems more appropriate for blood rather than breath, in that, especially in Homer, flowing is more natural for liquids in general and for blood in particular. Blood also naturally flows into the heart and at one point the *thumos* is the locale of the *ker* (heart), as mentioned above. At another point the *thumos* itself is said to beat (*Il.* 7.216).

When a god arouses the *thumos* in a person, e.g. *Il.* 5.792, this energy is very close or perhaps identical in meaning with the *thumos* which is weakened, or returns after weakness is corrected, or departs when death occurs. It is logical that it can be strengthened or augmented as well as weakened or diminished. Only the latter meanings have been included in our statistics of *thumos*, as "life force". The strengthening of the *thumos* may be regarded as simply emotional.

Nineteen of the ninety instances of *thumos* as "life force" indicate the life of a person in a weakened state. In these nineteen instances death either occurs simultaneously or is mentioned hypothetically (as in a curse: e.g., *Il.* 8.358). One weakened state comes from fainting: *Il.* 5.698, *Il.* 14.439, 15.240, *Od.* 5.458, 24.349, *Il.* 22.475 (all of which are followed by recovery) and *Il.* 4.524, 16.468 and 20.403 (which are not).[32] *Od.* 5.468 is an instance of hypothetical nonrecovery.

32. Nehring has omitted *Il.* 4.524 from his statistics in "Homer's Description of Syncopes." He also has omitted the instances involving a lack of *thumos: Il.* 3.294 and *Il.* 20.472. *Thumou deuomenon* (lit. "lacking *thumos*," *Il.* 20.472) has been translated as "swooning" (by Murray, Loeb ed., p. 405), so passing mention of this might have been in order. He also listed *Od.* 5.468 as an instance of "Syncope Followed by Recovery," yet it is clearly an instance of hypothetical nonrecovery: Odysseus imagines that he could be overcome by the cold in a state of exhaustion.

In *Il.* 3.294 sacrificial victims have their throats cut and are writhing on the ground "lacking their life-spirit (*thumos*), for the bronze had taken their strength (*menos*)." One might envision them gasping for breath as they went through their last struggles, obviously ending in death, which is expressed as their strength being taken away. A lack of *thumos* would seem an immediate predecessor of death, which in *Il.* 20.472 is expressed by the phrase "and darkness covered his eyes." In the last case the victim may be said to lack *thumos* because of a loss of blood: his liver had just been cut out and "black blood covered his chest."

Besides fainting, one can be in a weakened state from a wound or exhaustion. In the case of Agamemnon, as we have seen, the mere thought that his wound might be fatal weakened him (*Il.* 4.152). So in *Il.* 1.593, Hephaestus found that only a little *thumos* remained in him after his fall to Lemnos (cf. *Od.* 5.468).

We know that Hephaestus is a god and hence cannot have his *thumos* leave completely, never to return. Similarly, there is no fear that Ares will fail to revive when it is said that he could scarcely recover his *thumos* after Athena had struck him on his neck and "loosed his limbs" (*Il.* 21.406), another common expression for death. In both the case of Hephaestus and Ares one is tempted to envision them as having the breath knocked out of them or as gasping for breath, since in neither case can one consider their lives threatened, in view of their immortality. Physical exhaustion accounts for the wasting of *thumos* in *Od.* 10.78 from grievous rowing and in *Od.* 19.263 from too much weeping. Likewise the allies are seen as wasting their lives (*thumon, Il.* 16.540) if Hector will not trouble to bring them help. *Od.* 10.461 might be put in this category. Circe offers Odysseus' men food and drink to revive their *thumos* since they may be weak and spiritless (*athumoi*) when they think about their wanderings. Their *thumos* is not enjoying good cheer (*Od.* 10.465). The *thumos* which will revive may be the physical *thumos*, since it can be revived by food and drink. But it may be parallel to the one that experiences good cheer. When the *thumos* returns to the *phren* (diaphragm), the instances are clearly those of recovery after fainting. When it returns to the *stethe* (breast), a recovery of "spirits" may be indicated rather than a physical recovery (*Il.* 4.152 and *Od.* 10.461). It is also interesting that psychological recovery is close to physical recovery and this is typical of the entire Homeric psychological and physical makeup.

An important compound includes *thumos* as "life force"; it is θυμηγερέων (*thumegereon*), "gathering the life force". It is what Odysseus tells Alcinous he did when he climbed out of the river on reaching his land (*Od.* 7.283). It is the only time this compound occurs. By analogy with instances of fainting this can be assumed to indicate a type of reviving. The word has been translated as being "worn out" or "gasping for breath,"[33] but *thumos agerthe* was what happened in regaining one's breath after fainting (e.g. *Od.* 24.349). A possible rendering is "catching one's breath" but not "gasping for breath." Revival then is a regathering of one's *thumos*, whereas fainting is expressed by the compound ἀποψύχειν (*apopsychein*) "breathing out one's *psyche*", *Od.* 24.348, cf. *Il.* 22.467-75: "he breathed out his *psyche.* He breathed again and gathered his spirit, *thumos*, into his diaphragm, φρήν (*phren*)". The weak state is induced by an exhaustion of *psyche*, whereas the regathering of the *thumos* signifies revival. One might consider this not only as a return of air but an increased flow of blood; a regathering of life spirit could express either.

Menos, like *thumos*, is another "life energy" rather than "life breath" (*psyche*), "life" (*bios*) or "lifetime" (*aion*). The *menos* is a stirring force which gives a person power and energy in battle or simply in accomplishing things such as bending a bow. In phrases it is linked with other forces such as *alke* ("defensive prowess," *Il.* 6.265), *tharsos* ("boldness," *Od.* 1.321), *androtes* ("manliness," *Il.* 24.6), *thumos* (*Od.* 11.562) and *psyche* (*Il.* 5.296). In the instances in which *menos* is clearly a life force, in that it departs at death, it either departs alone or with the *thumos* or the *psyche.* The *menos* of a person never enters Hades, though an *eidolon* ("shade") in Hades can be said to have its emotive counterpart: Odysseus says to Ajax, "Subdue your anger (*menos*) and the lordly spirit (*thumon*)", using a word which is often used in connection with taming wild animals (*Od.* 11.562). So also we have been told that the dead lack *phrenes* and yet they show the intelligence associated with this term. So an *eidolon* can show anger or passion, but cannot possess the force or organ that produced these emotions in life.

The *menos* differs from the *thumos* in that it is never an intellectual or emotional organ, but rather the function or resultant force. Its

33. Murray, Loeb ed., p. 253. "Worn out" is Rouse's translation in *Homer, The Odyssey* (New York: Mentor Books, 1937) 86.

emotive range is also more limited; its meanings range from anger (*Il.* 1.207), courage (*Il.* 6.407), mad daring (*Od.* 20.19) to the simple force of being startled (*Il.* 23.468, *Od.* 24.319). It can indicate personal disposition (*Il.* 5.892). Sometimes it means simply strength: the strength of fire is its most frequent association in the *Iliad*; at one point, *Il.* 17.565, Hector is said to have the dread fury of fire, but in *Il.* 24.792 the might of fire "has" Hector as he is consumed in his pyre. Thus also it is characterized as unquenchable (*asbeston, Il.* 22.96), but extinguishable in *Il.* 16.621. In the *Odyssey*, where the more "steadfast" strengths are valued, *menos* is characterized as "firm" and is compared to iron (e.g., *Od.* 12.279 and 19.493).

There is also the *menos* of rivers (*Il.* 12.18), winds (*Od.* 5.478), horses (*Il.* 17.476), panthers, and lions or boars (*Il.* 17.20). This term can also stand for the person himself and one speaks for instance of the *menos Alkinooio* (Alcinous, *Od.* 8.423) as one speaks of *bie* (another form of strength) in similar contexts to denote a person.

The *menos* can be breathed into a person (by a god: *Il.* 10.482), stirred up (*Il.* 7.38), awakened (*Il.* 15.232), increased or diminished (*Il.* 15.493), placed in the *thumos* (*Il.* 16.529) or *phrenes* (*Il.* 21.145) or even limbs (knees: *Il.* 17.451) and breast (*Il.* 5.513). Nothing is ever placed in the *menos*; this shows again that it is not an organ or the site of a force. *Menos* is also joined with "hands" (*Il.* 7.309) to indicate strength in battle and with "knees" when strength in running is needed (*Il.* 22.204).

Etymologically *menos* is related to *mainomai* ("to rage" or to "be mad") as well to *mens* (mind), and the relation with the former is easily discerned. Since words are said to rouse a person, the mental and emotive connection certainly exists (e.g. *Il.* 5.470 — the most frequent use for this term in the *Iliad*). At times Homer links the terms for madness and strength, e.g., Diomedes is said to be mad and as a result no one is able to stand against him or equal his rage or strength or courage (*menos, Il.* 6.101).

Such passages show certain meanings for this term as "rage", "emotive force", "physical force", the force that is identified with a person and "life force". The lines are not always clearly drawn. It is probable that the physical force which gives power to a person's hands or limbs in life is the same as the power that is released at death. However, only the *menos* which is lost at death shall be included in our statistics for *menos* as a life force. This is similar to *thumos*, but there is a difference here. When the *thumos* is weakened, as for example in a faint, the vital forces are threatened and death is a

possibility. When the *menos* is diminished (e.g., *Il.* 15.493), it is mainly a person's excess power, rather than his vital power, that is so affected.

Menos occurs 134 times in the *Iliad* and 47 times in the *Odyssey*. We saw the same relative proportions with *thumos*. As each epic progresses the virtues of passion must yield to those of patience and restraint; the lesson is one that even Odysseus had to learn. So also *menos* as a life force occurs only in the nominative and accusative cases. In one instance the *menos* is considered destroyed with the *thumos* (*Il.* 8.358). In another, bronze takes the *menos* away (*Il.* 3.294). In all the other instances *menos* is released at the moment of death and some form of *luo* ("to release") occurs (*Il.* 5.296, 8.123, 8.315, 6.27, 17.29, 17.298, 16.332 and *Od.* 3.450). The use of *luo* well characterizes the force of menos as that of fire or wild animal, which darts off when it is released at the moment of death. In *Il.* 6.27 the "glorious limbs and *menos*" are loosened simultaneously: the limbs relax in death as the force that moved them departs.

Two ambiguous examples occur in the *Iliad*. In *Il.* 16.621 Hector is told that it will be difficult for him to extinguish the strength (*menos*) of all the men, although he is powerful. "Extinguish strength" may indeed mean "kill" but it also may mean "check the strength" or something milder than death.

In *Il.* 24.6 we find Achilles longing for "the manliness and goodly strength (*menos*)" of Patroclus. This is a strange phrase and unique in the usage of *menos*, unless we identify it with the use in which it signifies the person himself. One poetical idea would be to identify this manliness and strength with life; then the entire phrase would mean simply that Achilles was longing for Patroclus to be alive again.[34] For Homeric man life, like the human body, was a composite.

The one ambiguous example from the *Odyssey* was 4.363. *Menos* here can mean "strength" or "life". Menelaus says that while he was in Egypt he would have used up all his stores and the *menos* of his men had a goddess not taken pity on him. The Greek word for "use up" (*katephthito*) can also mean "destroy": the loss of the stores might indeed have been fatal for the men. Once again we see the close connection of food with life and certainly strength: the destruction of one leads to the destruction of the other (cf. *menos* and *alke* being in food and wine, *Il.* 9.706).

34. The peculiarity of these lines caused them to be rejected by Aristophanes and Aristarchus.

Etor, another Homeric term for life, occurs 48 times in the *Iliad* and 35 times in the *Odyssey.* Like *menos,* it appears only in the nominative and accusative cases. It has an emotive and intellectual range of meanings which it shares with *thumos. Etor* does not provide movement to the limbs, nor is it located there. Instead we find it is in the breast (*Od.* 20.22, *Il.*19.169) or heart (*Il.* 20.169). In the *Iliad* it has a wide range which include anger (10.107), courage (19.169), and fear (21.114). The most frequent use in the *Odyssey* is usually to denote sorrow (e.g., 7.287).

Etor at times is closely identified with the heart. In emotive contexts this is easy to understand but physical contexts show that the anatomical location is conceived vaguely. In *Il.* 16.660, the *etor* is "struck" and the fatal wound occurs at the place where the midriff (*phrenes*) closes about the beating heart (*ker,* 16.481), which Homer locates in the upper midriff. But in *Il.* 17.535, the *etor* is pierced, but the wound is in the bowels (524). In *Od.* 16.428 the life of Antinous' father is in danger; his enemies wish to kill him and rend his *etor,* i.e. his heart or his life. The terms for piercing and rending are unquestionably concrete, but the fact that the *etor* does not have a fixed location might indicate that the use in this passage is figurative. Both the *etor* and the *thumos* are conceived of as beating (*Il.* 22.452 and *Il.* 7.216), but this does not make them identical with the heart. They both can be exhaled at death (*Il.* 15.252 and *Il.* 13.654).

If we conclude the three instances just mentioned, in which the *etor* is stabbed or rent at the moment of death, we have seven instances of *etor* as a life force in the *Iliad* and four in the *Odyssey*—one that has just been discussed and three in which the *etor* is weakened so that continued stress might lead to death.

In the *Iliad* the *etor* is destroyed (5.250), taken away (11.115, 21.201, 24.50), or gasped forth (15.252), whereas in the *Odyssey*, the *etor* is mainly diminished when it is regarded as a life force. For instance, it is weakened as the food supply is exhausted (*Od.* 4.374 and 467, cf. 4.363 where the *menos* is destroyed along with the food supply). It is possible that in both cases merely a depression of spirits is indicated. Then again in *Od.* 19.136 Penelope says that longing for Odysseus is melting away her life spirit (*etor*). Longing for Odysseus also "took away the honey-sweet life" (*thumon: Od.* 11.203) of his mother, hence we know it can be fatal.

As we shall see, the *etor* can be wasted, taken away, and in some instances, rent or stabbed. It never flies away at death. When it is

"loosed" — usually together with the knees — the loosening is not fatal but indicates fear (*Od.* 4.703) or love and joy (*Od.* 23.205, 24.345). Overwhelming emotion can be like death.[35] Each instance of the *etor* being "loosened" or "melted" follows a declaration or an observation that leads to understanding (*Il.* 21.114 or *Od.* 22.147). The *menos* also is frequently aroused by words, such as those which incite courageous deeds. The *etor*, in contrast, more passively registers fear or joy in response to words or signs.

These are the terms for life in Homer. We have seen *aion* as "life force" or "lifetime", *bios* and *biote* as "way of life", *biotos* as "means of life" or "life" itself, *bioo* as "exist". *Zoe* is "means of life" while its adjective and verb convey respectively the meanings of "living" and "life". We also have the life energies or forces: *thumos, menos, psyche,* and *etor* — "motion" or "emotion", "passion", "life" or "breath", and "life" or "heart".

These different terms contribute to a specific concept of life which paradoxically has a concrete existence, sometimes as an organ, sometimes a force, sometimes a time span, and sometimes a simple activity. Its pale reflection can be found in the underworld. The means of life, such as food, drink and wealth, can be expressed by terms which also mean life itself. In later literature *zoe,* which in Homer merely indicates the means of life, becomes the preferred term for life. All these terms show that physical and emotional phenomena were regarded as closely linked to life and as virtually identical with it. Homeric man lived life as a totality of physical and emotional experiences such that if any part were absent, existence was either not worth living or was negated entirely. Only mortal life on earth, with its joys and sorrows, its banquets, its honors, and its bright movement, is the life worth living. The Homeric terms for life demonstrate this.

University of California
Irvine

35. From uses such as this in Homer, where the vocabulary of death can be used in the context of love, one finds this use becoming standardized in later Greek love poetry (see Sappho's physical description of love symptoms in the poem beginning *Phainetai moi kenos* . . . "Like a god is that person who sits across from you. . .").

Clinical and Social Aspects of Violence*

JOHN R. LION

AGGRESSION is an extensive topic, covering many aspects of man's social and personal behavior, and including such things as wars, riots, homicide, and suicide. I shall start and end my presentation on a clinical note and mention a patient whose case I recently reviewed. That patient had originally come into treatment because of aggression in the form of violent outbursts directed at his wife and children. In the course of treatment he examined his own emotional deprivation. He became aware of his fragile self-esteem, which was shattered whenever he was criticized. Most of us can respond rather neutrally to insults, since we believe in ourselves. This patient could not, and his outbursts revealed his vulnerability. As therapy continued, he became more depressed; this is often noted in the course of long-term care. The depression became intolerable, since the usual emotional outlets were no longer available to him. His lashing out at others was not the answer to his own problem. One day he shot himself. He left no note, and I can only surmise that he had learned well how to internalize his anger, but that the risks of that process had been too great. The gun he used to end his life was the same one with which he had threatened members of his family in earlier years.

This example illustrates the complexities of violence. Suicide is one side of the coin, homicide is another. Aggression is a life process. To be alive involves being constantly frustrated and irritated to varying degrees. To appreciate this you need only recollect a sample day's activities during which you encounter innumerable small spurts of anger from the parking lot to the office and back home again. The question for each of us is how well we modulate our aggression and use it in the service of such diverse enterprises as child rearing, professional advancement, recreation, and creativity. Sometimes we point the gun one way and become depressed; sometimes we point the gun the other way and become destructive or over-react to others. Lest one doubt the validity of the inward/outward theory of aggression, one should look at statistics such as those given by Donald J. West in his book, *Murder Followed by Suicide* (Cambridge: Harvard University Press, 1966).

*Susan Doerr Brodsky Lecture, May 1979

West describes an English population sample in which one third of all murders were associated with suicide. Periodically this is seen also in American newspapers and usually causes astonishment or puzzlement. The phenomena represents the culmination of aggression which was improperly channelled at its onset.

The fact that violence is born of despair was made clear to me when a group of us began to study violent patients entering the emergency room of several hospitals in Boston. These patients had not been studied previously. We attempted to obtain some epidemiologic facts about them and to develop psychodynamic parameters.

Several facts emerged. First, it became evident that violent patients actually did come to a medical facility and psychiatric emergency room. Second, we were impressed with the fact that they did "cry for help" just as suicidal patients did. It then became evident to us that anger was a dystonic and dysphoric state, i.e., most violent patients did not enjoy being violent. This is contrary to what one would suppose. Somehow, one would think that anger is a powerful and exhilarating state of mind. It is not. If one recalls the last time one was angry and multiplies it by one hundred, one gets an awareness of what an unpleasant affective state rage really is and how much one really wants the tension reduced.

Many of the patients whom we saw in the emergency room had been involved in previous violent acts. We saw rapists, assaultive persons, child batterers, wife batterers, and even homicidal patients. In a sample of one hundred thirty violent patients eight had committed murder, three armed robbery, and more than sixty-five had convictions for other violent criminal offenses. Clearly, the sample was significant in terms of its content of violence.

Our study of violent patients in the emergency room attracted unusual attention. Few psychiatrists had bothered to study violent patients in emergency-room settings and usually tended to refer them elsewhere or relegate them to the criminal justice system. As I began to study violence, I understood that the psychiatric profession in general had shunned it, for very good reasons which had to do with the anxiety generated in the physician who came in contact with the violent person. That physician had to make some obvious clinical decisions which involved the police. I found that psychiatrists were frightened of violence. There were issues of responsibility, and there were issues of having one's own violent urges stirred up by these patients. In reviewing the matter it became evident that the profession had written little about aggression. Yet there was a

precedent for this avoidance. Freud himself had sidestepped the study of aggression. His unique contribution was in the area of childhood sexuality. Although he did describe aggression, he linked it with a sublimated state seen in certain conditions such as conversion of psychosomatic reactions. But not only did Freud avoid the study of aggression, criminologists do this also. Marshall B. Clinard and Daniel J. Abbott, in their book *Crime in Developing Countries* (N.Y.: Wiley, 1973), have estimated that on any one day there are two million incarcerated individuals in the world, but there are fewer than 1500 criminologists engaged in criminologic research on more than a part-time basis. This disparity between those who study the behavior and those who engage in it or suffer from it is astonishing. It is in marked contrast to, say, cancer researchers and cancer, where much more favorable ratios exist. Criminology and penology are subjects which have never been as popular as what one might call companion disciplines such as anthropology or sociology.

Despite the fact that crime may not be studied, it certainly continues to appear on the front pages of newspapers day after day. Society never tires of this, and even derives enjoyment from it. Every violent detail is well described; television and the cinema acknowledge no limits with regard to violence. The art seems to have reached its acme about two years ago, when a film called *Snuff* was shown in several East Coast cities. This pornographic film aroused great concern on the part of the film censor board in Maryland, the only state currently possessing such a board. The censors were dismayed not by the sexuality in the film but by the raw violence, which included dismemberment with various electrical tools. The board of censors filed suit against the distributor of the film in order to have it banned. The State took a novel position, namely that the film was too violent and that its pornographic quality lay precisely in the violence. Thus, the State maintained, the violence appealed to prurient persons such as sadists, and met the other legal tests for pornography in the State. The fact that Maryland found the film to be pornographic on the basis of excessive violence established a notable standard for pornography.

As I testified for the State, I had great difficulty with this film. On the one hand, I found the film obnoxious. Yet it was difficult to prove that the film was "too violent" as opposed to all that one sees on television, and I had difficulty demarcating excessive sexuality from excessive violence. Obviously, I am not

alone in experiencing this difficulty. Sex and violence go hand in hand with regard to normal arousal patterns and with regard to their value on the closed and open markets. I had less trouble when I was hired by the defense for a subsequent motion picture. On this occasion, armed with a flashlight and clipboard, I sat through a rather repulsive film produced by one of the country's leading pornographers. Subsequently, I telephoned his attorney.

I said, "This film has no redeeming social or artistic quality whatsoever." He replied, "I'm not interested in redeeming quality. I represent a multimillion dollar business and I need to know if the film can get through the censor board." That was the gist of it. I suggested to the attorney that his client, the producer, cut out approximately twenty to thirty minutes worth of atrocities from the film in order to get it past the film censor board. The attorney doubted that the producer would bother with this; he would simply withdraw the film from the Maryland marketplace and sell it somewhere else. He subsequently did this. Long lines of people later clamored to see the latest in cinematic aggression and paid a premium price.

I have mentioned money, and the economics of violence is worth thinking about. As Dean Kittrie of the American University Law School says, violence pays and crime pays. Kittrie is referring not to media industries but to the fact that the rate of apprehension in most crimes, particularly burglaries and robberies, is so low as to make it worthwhile for criminals to engage in crime repeatedly. The entire industry of crime and punishment is huge. If one thinks about the Law Enforcement Administration Agency (LEAA) and the vast sums spent by that organization alone on crime prevention hardware and, to a lesser extent, on crime prevention software, one cannot help but be impressed. More recently the National Institute arm of the LEAA has sponsored a series of symposia in an attempt to devote more intelligence and less money to the problem of crime. As a participant in one of these symposia, I have been impressed with the fact that money will not make the study of crime more palatable and that researchers truly rack their brains in attempting to make productive the study and understanding of criminal behavior.

One of the recurring recommendations made to the Institute is that attention return to the biology of aggressive behavior. This suggestion revives old efforts. For centuries, man has tried to connect physiologic parameters with criminal behavior. After the

earlier notion that criminals looked different and had a different physiognomy than non-criminals, more sophisticated studies have devoted attention to biochemical correlates of aggression, and more recently to cerebral dysfunction. An example of such dysfunction is epilepsy. Frank Ervin, my former teacher, has done a great amount of work in this area. His work, as you may be aware, is controversial, but the controversy lies not so much in scientific aspects as in the social application of his contributions. You will recall that Ervin, Sweet, and Mark began to do amygdalectomy in violent cases of temporal-lobe epilepsy. It was thought that destruction of a nucleus within the brain would lead to pacification. I have seen the patients, and concur that the research was extraordinarily valuable in delineating the cortical locus of aggressive behavior. We learned much from these studies. Mark and Ervin went on to write a book called *Violence and the Brain* (New York: Harper, Row, 1970), which was published in paperback for the lay public. At the same time Michael Crichton, author of *The Andromeda Strain,* wrote a novel entitled *Terminal Man* (New York: Alfred Knopf, Inc., 1972). When this book was made into a motion picture there was a strange resemblance between the film and the Mark-Erwin book. The thesis and the plot of both is that the control of behavior is in the hands of the neurosurgeons, an alarming proposition, especially in the opinion of the American Civil Liberties Union. But if the general public and its legal protectors protested this new scientific development, so did the National Institutes of Health. In 1973 a special meeting on the subject of brain dysfunction and violence assembled approximately 100 scientists from around the world to study and make policy statements about present knowledge of epilepsy and violence.

The importance of this meeting must be understood. Ervin's group had embarked upon work considered so bold and frightening in scope and social implication that the scientists were called to create some curbs on its progression, much in the way that research on recombinating DNA was halted by agreement of the scientific community. A way had been found to control violence, a way that posed the gravest policy implications for the country. The implications were behavior control. The concept of behavior control is alien to America. This country will tolerate many things, but it will not tolerate psychologically coercive attempts to interfere with personal liberties, even if those liberties involve some form of deviant behavior. Man must be free to be violent, preposterous as

this sounds. In fact, in the minds of many, violence and violent behavior are synonymous with the rights and liberties of a democracy. One is almost reminded of Patrick Henry's violent statement "Give me liberty or give me death." This is how vehement the country feels about the potential and inclusive right to behave as one wishes, whether one is a homosexual, a militant activist, conservationist, segregationist, etc. No one wants "doctors messing with their minds." No one wishes the neurosurgeon to decide when the patient should be subjected to amygdalectomy in order to control his behavior. The next thing that will happen is that prisoners will be put on operating tables and that, in sequence, other minorities will be operated upon to reform their behavior. Visions of Nazi war experiments shortly follow. Sentiments surrounding psychosurgery were so strong that a moratorium on further research was imposed. The recent Commission proposes to lift this ban but wishes to establish safeguards on the procedure. I concur with these sentiments, for work on the biology of aggression must proceed. The moratorium has made it difficult, if not impossible, for clinicians to carry out needed work. Currently there are only pockets of research effort underway in diverse areas such as Texas, California, and here in Philadelphia, where I have long admired the work of Frank Elliott. Doctor Elliott is a rare clinician who has had the courage and interest to study violent behavior from the standpoint of clinical neurology.

From the topic of freedom to pursue research on cerebral dysfunction I shall skip to freedom of the press. A free press is crucial to non-violence, yet I have often wondered whether or not we should curb or soften the excessive coverage given by newspapers to acts of violence. The strength of a newspaper lies in its ability to report anything it wishes, yet I often wonder whether responsible journalism cannot somehow be linked up with displacement of news. I become particularly upset when a flash spot occurs on the television which says something like "Massacre in Guyana . . . details on the 11 o'clock news." This type of coverage of atrocities as they occur, sensationalizes violence and gives it a perverse dignity which has yet to be considered by the medical profession.

During a recent blizzard looting occurred in Baltimore. I wrote to three television stations protesting their sensationalistic coverage of this event. I was especially concerned about their emphasis of the fact that police were hampered by the snow in their efforts to protect

property. I wonder whether such emphasis might not have been conducive to additional lawlessness. Two replies were predictably defensive and self-righteous. To my surprise and delight, one major network answered thoughtfully and stated that "upon review of the matter, we think we might have used a little more restraint."

Non-violence and open speech are interlinked. Journalism developed our awareness of atrocities committed during the Vietnam War and perhaps was responsible for the decline in popularity of that war and the subsequent relinquishment of our efforts to fight. On the other hand, I can recall very vividly the Airline Pilots Association of America and the warning it gave with regard to the skyjackings that were so frequent only ten years ago. The Association voiced its concern about the great publicity given skyjackers. These persons were almost eulogized and their sense of power and importance accentuated by the worldwide on-the-spot coverage given them. If in your fantasy you wanted the whole world at your feet, all you had to do was commandeer an airplane and every newspaper reporter and television camera in the world would be turned your way. In no other arena in life was such attention possible. I shall have more to say about skyjacking, but for the present I want to use skyjacking as an example of how a culture can tolerate and not tolerate deviant behavior. In this respect I wish to discuss continuing controversies about the punishment of prisoners in this country.

As you may be aware, the current philosophies of incarceration are in the direction of fixed sentences without any attempt to rehabilitate or reform. The attitude towards fixed sentences is most cogent in Norval Morris's book, *The Future of Imprisonment* (Chicago: University of Chicago Press, 1974). Here the author contends that there is little evidence that rehabilitation programs work or that they in any way affect recidivism. The text favors a fixed sentence and the prevailing attitude is that the number of prisoners dictates "punishment" and precludes therapeutic intervention. The argument for fixed sentence is an interesting retributive one. It contrasts with society's present attitude towards youthful offenders, which is also undergoing change.

Several years ago I went to court on behalf of a 13 year old boy who had killed an elderly person during an robbery which had yielded eighty-seven cents. At that time, I testified that this child should be treated as a child and not as an adult; hence he should be sent to a rehabilitation center rather than being converted into a

hardened criminal by exposure to jail. When I left the courtroom, I felt as though I had betrayed myself, because what I really would have liked to say was that the boy should be put to death. This was a feeling which I suppressed in the effort to be a benevolent physician. I usually favor capital punishment, not because it has any different effect — there is not compelling evidence that it has — but because it simply fulfills a retributive value which I feel is necessary to contain the violence in a society. Yet I have heard elegant arguments against capital punishment, including the proposition that society might by error take the life of a man who is not guilty. This argument is a risk/benefit ratio argument which I can dismiss from my own mind although it assumes convincing weight in the minds of others. The point is that capital punishment is a value judgment. As such, it makes no sense at all, as do most value judgments. Value judgments are values, aesthetics, senses of right or wrong. For example, in Maryland legislation has been introduced to make life imprisonment mandatory for kidnappers, the killers of guards and policemen, and double murderers. This thinking is partly logical and partly illogical. Why should the killer of a policeman be given a life sentence when a killer of an ordinary citizen is not? Why should two murders justify life imprisonment when one does not? These are senseless value judgments which society tries from time to time to impose in the name of law and order.

Value judgments bespeak conflict. In this country, there are conflicting attitudes towards criminals. We cry for more controls in crime, yet bend over backward to ensure the rights and dignities of the very prisoner so quickly released under liberal conditions of bail, bond, parole, and probation. This ambivalence about punishment is seen in other portions of the world; for example, West Germany has recently decided to extend the statutes allowing for the prosecution of Nazi war crimes. Many said that enough is enough. Others said that the world needs to remember what mankind is capable of. Still others are straightforward and want vengeance, but how long can vengeance last? There are no easy answers. Some solutions are doomed from the start. The overcrowding of the jails in Baltimore led the State to buy a discarded naval vessel for use at anchor as a minimum-security dormitory and half-way house for prisoners. Correction officials referred to it as a "prison ship", instantly dooming the venture, for it conjured up the fantasy of galley slaves coerced to row under the hateful eye of a whip-wielding

master. I asked the Deputy Director of Corrections for the State why he had chosen that title. He shrugged and said that the whole thing was society's fault. Ambivalence about prisoners is often betrayed by astonishingly inappropriate choices for prison sites or half-way houses.

I shall now turn to methodology. I mentioned at the outset of my talk that for emotional reasons psychiatrists had difficulty in studying violence. It is also true that for methodological reasons behavioral scientists have difficulties in studying violence. One formidable problem is that violence is short-lived behavior which occurs for seconds or minutes, whereas depression may exist for days, weeks and months. Psychoses also usually exist for long periods. Aggression is a paroxysmal behavior of a very abrupt nature. It occurs rapidly. The trigger is pulled quickly, the assault is carried out in moments. The behavior may be repetitive, but its duration is exceedingly brief. Thus the clinician who studies the violent person usually sees that person inter-behaviorally, if you will, between morbid episodes. This is not true of depression, where one can observe the profound alterations in mood, the sadness, the anorexia, the insomnia, and the psychomotor retardation, or in schizophrenia where one can easily observe delusions or hallucinations. All too often the aggressive person appears normal when we see him in the office or even in prison. Therefore, unless we follow him to the bar where he gets into arguments or into the home where he becomes violent, we cannot witness the erratic behavior and understand its precipitants and dynamics. This is a difficult problem and puts the observer at an immediate disadvantage.

Incidentally, the fact that violence is paroxysmal, episodic, and recurrent accounts for the fact that epileptologists have for so long been interested in it. It reminded them — and continues to remind all of us — of epilepsy. Hence, it is not surprising that the behavior is viewed phenomenologically as an epileptoid state or an epileptoid equivalent.

Methodologic considerations also play a role in the use of drugs for the treatment of aggression. Despite the large number of psychotropic agents on the market, no one drug is better than any other in the control of aggression. Chlordiazepoxide (Librium) was initially considered useful in aggression because preclinical studies in animals had shown pacification, but the drug is of limited usefulness in the treatment of aggression in man. In fact, there is no

antiaggressive drug now available for use, although the drug industry has attempted to prepare one. This in itself poses the same ethical problems as were mentioned previously in the discussion of psychosurgery. Several years ago a pharmaceutical firm approached me regarding the development of a drug to be used for the treatment of aggression. At that time, the firm was concerned as to whether the development of such a drug would pose ethical problems similar to those encountered in neurosurgical control. We decided at the time that the company should devote its efforts elsewhere. Since then, I have had a change of heart and within the past year I have tested an alleged "anti-aggressive" drug. The substance was marketed initially as an antipsychotic but proved to be ineffective. On review of pre-clinical data, it was found that the drug possessed a tendency to tame monkeys and wild Norway rats. We gave the drug to eight patients in double-blind fashion. The study posed ethical problems, as you can imagine, but was eventually approved by our institutional review board for limited study. Methodological problems then began to appear. For instance, in a study on the use of methylphenidate (Ritalin) in hyperactive adults we had discovered that such patients, once hospitalized, showed low base rates of behavior. When you take a labile patient and bring him into the hospital, he quiets down, there is nothing to measure. Therefore, we had to use outpatients but then had to tabulate their violent outbursts. We thus required a rather hedonistic, antisocial, aggressive outpatient with a high base rate of violent behavior who was compliant enough to engage in a double-blind active drug/placebo study, and to come to us twice a week for two months and keep accurate account of his behavior. Obviously such a patient would be well, not sick, and there was an inherent paradox in this selective process. Nevertheless, we found such patients and devised a daily diary by which they had to record the type, intensity, and frequency of violent outbursts. In order to corroborate this, we gave the diary to the spouse also but then discovered that the patient and spouse began to have arguments and fights over the entries. Ultimately, we gave them diaries in sealed envelopes which they brought to the office and which we compared.

Methodological considerations led me to a pleasant journey to the Caribbean island of St. Christopher (St. Kitts), in the days when there was just one dirt landing strip and a single road into the jungle areas in which the untamed vervet monkey dwelled. I had gone

there to see "natural" aggression among primates, but I was disappointed, for the monkeys were an amicable breed and did not fight. I mentioned this because good animal models of aggression are also rare among humans. Most laboratory simulations of human aggression are contrived and have almost nothing to do with the on-the-street behavior. Unfortunately, many workers in the field of aggression have extrapolated theories from experimental paradigms in which a teacher insults a group of students, or studies in which students unwittingly give simulated electric shocks to colleagues, or in which children watch television and then hit life-size air-inflated dolls. These types of occurrence have little to do with rape and murder.

Another problem encountered in studying violence is omission of the study of victims. It is now well recognized that victims play a prominent role in all violence and a discipline of victimology has arisen. Interesting problems appear in the study of victims. For one thing, the profession has usually been reluctant to study victims. It is only recently that child abuse has been made a quasi-medical entity, whereas for centuries, physicians simply looked the other way. There is nothing new about child abuse or about wife battering; these phenomena have existed through the history of mankind and only recently have been brought to social attention. Stranger-to-stranger crimes, while on the increase in this country, are still comparatively rare in contrast to violence which goes on between people who know each other, because people who know each other can wound each other emotionally. Thus violence occurs in families, between lovers, between intimates.

The fact that intimacy exists between perpetrator and victim leads to discussion of the recent Tarasoff Decision in California. During psychotherapy a patient revealed to the therapist that he intended to kill his girlfriend. Eventually the patient killed her. The family of the victim brought suit against the psychotherapist. The Court of California found that a therapist had a duty to warn. The psychiatric profession, upset by the implications that any therapist might have to report whenever a patient fantasized harm, participated in an appeal to the California Supreme Court, which upheld the communicable-disease model whereby a therapist, if he is convinced that harm is intended, must warn those at risk or report the situation to the authorities. The rule is still problematic for the profession, though it strikes me as common sense, for there is always a

continuous pathologic relation between perpetrator and victim which requires resolution. However, I found common sense lacking in the legal argument presented during the Supreme Court hearings that I attended. The argument had to do with betrayal of confidentiality.

As many of you are aware, victims are often viewed as provocative. Thus I saw a man whose wife had given him an ornate revolver, which he used to kill her. I saw a man whose military buddy told him that he did not have courage enough to pull the trigger when the patient jokingly pointed a rifle at him. Highly charged provocative comments and actions of these kinds inevitably generate tragedy. One can only marvel at the destructive capability of the human mind. Covert provocation is also to be seen in clinical situations. Some specialists have pointed out that society cannot deal with the concept of helplessness. Thus, all too often, it blames the victim for the crime — accusing the man of leaving the door open, or the woman of walking through the park at night when she should have known better.

Many crimes involve innocent victims. Many states have statutes which provide compensation to such victims. Before he or she can be compensated by the State, the victim must prove that he or she was truly innocent and was in no way provocative. Few people know about such laws or utilize them. The point is that society does recognize the concept of victimless crime and attempts to do something about it.

A new phenomenon on the horizon involves victims of terrorists and mass violence. The taking of hostages has been known since antiquity; recently it has assumed significance in countries such as Italy or France. *The Wall Street Journal* has commented on the industry associated with the new rise of terrorism throughout the world. We now have firms which specialize in bulletproofing automobiles, teaching pursuit-driving techniques, and building remote control starting devices for those afraid of having a bomb wired to their automobile. This industry betrays the deplorable state of affairs whereby hostage takers achieve wide publicity as hijackers did recently in this country. The growth of kidnapping is matched by a new art or science of hostage negotiations which I witnessed this year at the FBI Academy in Quantico, Virginia, where a training center for hostage-negotiation has been established.

Can society do something about violence? The answer to this question is "of course". In this culture we can do more about

violence than we can about cancer, heart disease, or stroke — the diseases responsible for most deaths in this country. For those who doubt this, let me give an example. Skyjackings in this country began in the 1950's with flights to Cuba, increased exponentially in the 60's, and peaked in the late 60's and early 70's. Skyjackings were abolished almost overnight by executive order in 1974. At that time, metal-detecting devices were erected in every major airport in the country. The cost of this venture is several million dollars a year. No one ever questions the right of airports to search people. This society tolerated skyjackings for many years until the issue became economic. When skyjacking had destroyed and immobilized enough airplanes, the industry became active and exerted pressure on government. How quickly we took care of the skyjacker! — although he persists deviously in countries which give him sanction. Were those countries to give him this protection no longer, he would disappear.

Skyjacking is not the only social phenomenon that can be abolished. Much violence could be reduced by elimination of handguns, but legislative attempts to control handguns have always been doomed because of lobbying by the National Rifle Association and the strong conviction among Americans who consider guns to be part of their way of life. In America there are approximately seven thousand handgun murders a year, whereas in the combined populations of Japan, Germany, and England there are only about two hundred. Bartley-Fox legislation in the State of Massachusetts, where mandatory imprisonment results from conviction for illegal handgun ownership, has led to a reduction in gun-related crimes. However, these statistics apparently do not impel the public to act favorably.

A threshold must be reached before we again look at the gun and put it away for good. That threshold probably is another political assassination like those of John and Robert Kennedy. Thresholds play a crucial role in other ways in which this country responds to violence, personal and industrial. Witness pollution, the use of air brakes on freight trains, seat-belt legislation, the condition of garment workers — a host of diverse reforms all coming about because the tenth or one hundredth person lost his or her life. Death, especially violent death, is a common precipitant of social change.

Some countries have not only strict gun control but also strict traffic codes, which punish alcoholic drivers harshly. As Saleem

Shah of NIH has stated, in this country we are lax with the alcoholic driver, although he is implicated in more than half of all traffic fatalities. In Scandinavia, revocation of a license plus a jail sentence is meted out sooner, and morbidity and mortality on the highways have been reduced. In the United States 60,000 automobile fatalities occur each year. It should be remembered that during 1973 and 1974, the reduced gasoline supplies, the lowered speed limits, and decreased use of automobiles were associated with a reduction of the number of fatalities. This incredible saving of human lives was produced through inadvertant social manipulation which could well be extended if society saw fit to do so. Television and newspapers could revise their handling of news of violence, and a variety of tactics could be used to reduce violence.

It is clear that our culture does not want to do anything about violence; it evidently requires violence to motivate it. The strength of the American unconscious lies in its aggressiveness and assertiveness and in its militant pursuit of equity and social justice. American democracy is unique in this respect but it is also linked with the preservation of violence. I am therefore optimistic about the culture, but pessimistic about the control of violence. I concur with H. Rap Brown's statement that violence is as American as cherry pie.

What about the violence in other countries? I visited Colombia because I had read about *La Violencia*, a turbulent period between 1949 and 1958 involving mass atrocities carried out by bands of guerrillas in the Andean region of that country. The violence was politically motivated but was nonetheless heinous in quality and quantity; about 100,000 persons lost their lives. But the Middle Ages in Europe were as violent and brutal as the modern world. I am not persuaded that our society or the modern world is more violent. I think we are somewhat more humane now than ever before, although killing and torture are still in vogue in many parts of the globe.

I now return to the clinical observations. I was once asked to see a man who had killed his wife. He was a sensitive man — this is often the case and is unlike what one expects to find — and he talked a good deal about his life, its anguish and frustrations. He probably would not have killed her if a gun had not been handy, but that is beside the point. His wife was unfaithful and provocative, but that is also not the point. The point was that he killed her because he could not bear the thought of her infidelity and because his own

identity was so firmly and pathologically rooted in her existence. When I asked him why he killed her, he wept and repeated over and over again that he loved her.

Does this sound puzzling — to love and kill? It is not really; I can clarify the problem by referring to a passage in *Captain Newman, M.D.* by Leo Rosten (New York: Harper Brothers, 1956). The plot deals with a psychiatric hospital during World War II and with the bittersweet agonies of caring for the wounded. At the close of the book, the narrator relates what he learned from the war and from psychiatry:

> I learned that every one is lonely, at the bottom, and cries to be understood; but we can never entirely understand someone else, no matter how much we try, or want to; and each of us remains part stranger even to those who love us... I learned that it is the weak who are cruel, and that gentleness is expected from the strong... I came to see that every man is subject to fantasies so obscene, yearnings so mendacious, drives so destructive that even to mention them shakes the gates which we have erected against the barbarian within. Nothing in nature is half so strange as man's unconscious... in which the most confounding contradictions live side by side: the insatiable hunger for love, the boundless rage to kill...

School of Medicine
University of Maryland
Baltimore, Maryland 21201

ESSAY - REVIEW

STEWART WOLF. *Social Environment and Health.* The Jessie and John Danz Lectures. Seattle and London: University of Washington Press, 1981. 126 pp., illus. $8.95.

Reviewed by SAUL JARCHO

THIS book contains the lectures which Dr. Stewart Wolf delivered in 1979 during his tenure of the Jessie and John Danz Professorship at the University of Washington. His predecessors in that distinguished role include Julian Huxley, Francis Crick, Jacquetta Hawkes, Garrett Hardin, and Fred Hoyle. The wide scope of their interests and accomplishments can be said to constitute an appropriate introduction to the widely-ranging volume that is here under review.

Dr. Wolf's purposes are best given in his own words:

> I hope to support the proposition that effective social adjustment that yields personal satisfaction and fulfillment is conducive to health and that social failure, frustration, dissatisfaction, deprivation, and disapproval enhance vulnerability to disease. The idea is not new. Neither is it widely accepted... I hope to defend here a further proposition that the manifestations of disease are themselves evidences of biological adaptations to potential agents of disease, environmental challenges, including challenges in the psychosocial sphere... I would further suggest that the adaptations of the human organism, when exaggerated, insufficient, or inappropriate in some way, actually *constitute* the manifestations of disease [italics in the original].

An introductory chapter presents concepts of adaptation — biological and social — and concepts of disease. Behavior is said to be "the very expression" of adaptation, the term 'behavior' being used in its broadest physiological and psychological acceptation, which embraces both explicit behavior, manifested by muscular movement, and implicit behavior, manifested by such effects as glandular secretion. Both kinds of behavior come under analysis in subsequent chapters, which take up social stress, experiments on adaptive behavior, and the control of adaptive response. A final chapter, which can be considered the climax, discusses health and disease as consequences of adaptive behavior. The factual substrate

is derived from Dr. Wolf's own studies of individual animals and human beings and from his scrutiny of social groups in the United States and elsewhere. His own original contributions, reported in a long series of articles and books, are here amplified by the published observations of other investigators. An adequate list of references, an index, and fifty-five illustrations complete the volume.

An excellent sample is provided by the fourth chapter, which takes up the control of adaptive behavior and exemplifies the wealth of interesting observations and ideas that Dr. Wolf has been able to present in brief compass. After describing concisely some of the mechanisms which function in the little-known physiological realm intermediate between stimuli and responses, especially the inhibitory mechanisms that function either proximally or distally to the neural synapse (these mechanisms include neuroglia, recently accorded new eminence in the regulation of neural function), the author considers bodily changes and symptoms. Evidence of modulation in bodily functions leads to the surmise that "failure of restraints, or a defective balance between excitatory and inhibitory mechanisms, may be responsible for a broad range of disorders..." such as pathological aggressiveness, alcoholism, and epilepsy, and may be involved in some of the disturbances encountered in duodenal ulcer, hypertension, and fatal cardiac arrhythmia. Especially impressive are the researches, carried out by Dr. Wolf and other investigators, which have shown that extracardiac stimuli may cause several kinds of disturbance in the rhythm of the heart. The problem is now under increasingly active investigation. These and kindred subjects lead to a discussion of the dive reflex, which occurs in ducks, and its surprising aerial counterpart and converse in the flying fish. In an interesting corollary Dr. Wolf recalls a series of experiments, published between 1965 and 1978, in which he studied an analogous reflex produced in human beings by immersion of the face in cold water. He observed that the resultant cardiac retardation was increased in the presence of fear but could be prevented by distraction. Also instructive are series of experiments on individuals who show lability in their vascular responses.

Recent studies of bodily mechanism point to the importance of catecholamines and kindred substances which act normally as neurotransmitters and which apparently are also proving to be important in the mechanism of various psychoses. Considerations of this character lead the author to make some brief incidental remarks on causation:

> In bodily diseases as well [as in mental diseases], it is important not to interpret mechanism as cause. Every process requires a mechanism irrespective of underlying factors that determine susceptibility, precipitating events that trigger the process, or forces that tend to sustain or perpetuate the mechanism. The mechanism itself is not the cause.

The reader may wish to compare this formulation with the famous classification in Aristotle's *Metaphysics*.

In summarizing his own researches, those of his colleagues, and those of other investigators, Dr. Wolf presents a unified and composite concept of behavior, based on an integrated nervous system somewhat more elaborate than Sherrington's. It becomes apparent that the classic division of the neural mechanism into somatic and splanchnic is both a convenience of anatomic description and an aging artefact which is likely to be superseded as knowledge advances.

Dr. Wolf's book claims attention not merely because of its content, which is clearly and modestly presented and bears the mark of an experienced teacher. The volume is also, whether intentionally or inadvertently, the intellectual autobiography of a modern clinical scientist who has selected an important subject and has investigated it in laboratory animals, in individual human beings, and in human groups, encountering in the last-named the broadest and deepest social aspects of his theme. His work thus reflects some of the major concerns of our troubled era.

11 West 69th Street
New York, NY 10023

ESSAY - REVIEW

JOHN S. HALLER, JR. *American Medicine in Transition, 1840-1910.* (Urbana, Chicago & London, University of Illinois Press, 1981.)

Reviewed by CHARLES G. ROLAND

HALLER comes from the school of doom and gloom. He doesn't seem to like the 19th century, for he has little good to say for it. Certainly his monograph can function as a foil for the uncritical optimism of some earlier historians. For example, Major wrote of American medicine in the 19th century, that ". . . . it sought the best wherever it was to be found, and presently followed the spectacular advances in Germany with the same interest and profit as it had formerly followed those of Edinburgh, London and Paris."[1] The question is, does Haller err in the opposite direction?

Haller's main thesis (nowhere stated explicitly) is that the American medical profession evolved, during the 19th century, from a state of harmful ineptitude to one of sterile scientism. At the risk of being labelled a Pollyanna I would suggest that his account is singularly one-sided. For example, his chapter on drug therapy, "The Aging Materia Medica," consists almost entirely of three previously published articles by Haller, one on antimony, a second on mercury, and the third on arsenic. Each section is interesting, well-written, and thoroughly researched. But to imply that these three agents are all of materia medica for the 19th century is patently absurd. Nineteenth century therapeutics consisted of a great deal more than those elements; much of the remainder consisted of ineffective compounds used in ways that now seem bizarre, but there were efficacious drugs also. (Cowen[2] has shown that medical educators began to pay serious attention to materia medica during the century. This alone represents some kind of progress.) Yet this highly selective chapter begins with a blanket condemnation of

1. R. Major, *A History of Medicine*, 2 vols. (Springfield: Thomas, 1954), 2:764.

2. D.S. Cowen, "Materia Medica and Pharmacology," in R.L. Numbers, *The Education of American Physicians: Historical Essays* (Berkley: University of California Press, 1980), especially pp. 104-8.

"the false and presumptuous exaggerations of the materia medica in the nineteenth century" (p. 67), an unqualified and sweeping assertion that may turn out to be accurate but that requires more documentation than a catalogue of the unquestionable excesses indulged in by many physicians in prescribing antimony, mercury and arsenic. By the end of the 19th century, even William Osler, a so-called therapeutic nihilist, referred to mercury as a specific in treating syphilis.[3] Both opium and quinine are mentioned once in the introduction to the chapter and not again, and the latter drug does not even rate inclusion in the index. Yet quinine was a drug of enormous importance in the 19th century and scarcely can be omitted from any review of therapeutics at that time. Digitalis was available from the late 18th century. Salicylates were used in the latter part of the 19th century in treating arthritic disorders. At least a few other agents could be named whose inclusion would partially offset the gloomy picture presented by Haller, who seems intent on exposing the ogre of drug therapy (p. 99), and who reveals his own bias at the conclusion of the chapter by identifying this ogre as reaching its extreme at mid-century, though he began his chapter with a blanket denunciation of therapeutics *throughout* the century.

Haller claims that excesses of therapy "simply mirrored the gusto of American Society" (p. 99), but what is the evidence for this disarming boast? Contemporary reports of therapeutic heroism of epic proportions exist for Britain and for Canada in great abundance. Though the point hardly requires proof, note the following list of therapeutic measures used in treating a case of traumatic paraplegia, in Canada, in 1847: enemata, blisters, hyoscyamus, calomel, tartar emetic, opium, potassium iodide, sherry, mustard frictions, strychnine, galvanism, silver nitrate, zinc sulphide, silver oxide, and leeches.[4]

Haller's treatment of the topic of therapy during the period of transition, 1840 to 1910, suggests a bias of selection that enables him to present a dark image. In turn, this image contributes to the

3. W. Osler, *Principles and Practices of Medicine* (New York: Appleton,1892) 181.

4. A. Hall, "Case of Severe Concussion from a Fall, with Subsequent Extravasation on the Spinal Cord. Death in Thirteen Months After the Injury," *British American J. of Medical & Physical Science* 4 (1848):57-63.

mosaic that allows Haller to conclude that by the 20th century physicians were "overly pretentious," arrogant in authority, and demanding in privilege (p. 321). Without doubt, these strictures fitted at least some physicians. The question is, how many? And I believe the question is crucial. Moreover, the difficulty in answering the question points to a general dilemma for the history of medicine.

What medical historiography needs badly, and may never get, is a detailed study of the unexceptional physician in the 19th century (or in any era, for that matter). As in all societal groups, the medical profession consists of a vocal minority and a silent majority. We can discover what the minority thought and believed; because they were articulate and literate we have evidence of them. They exist. Inevitably, we infer from their words the attitudes of "the profession." But that great silent mass is part of the profession also, and it would be a bold historian who would suggest that their opinions are irrelevant. Even the unspoken conclusion that the minority represents the majority is highly questionable.

A prospective study could be done now, so that this evidential deficit might be lessened for future historians. With the availability of inexpensive tape recorders, an oral history program could be devised specifically to seek out a representative sample of the anonymous and record their feelings and opinions and experiences. Of course, it is likely that future students would complain that the wrong questions had been asked — but at least some record would exist to supplement the flood of published verbiage from those of us who need no urging to speak out.

All historians are aware of this particular part of the problem of the nature of evidence, although seldom is it recognized explicitly. Haller cannot be faulted for failing to use evidence that does not exist. Yet his conclusions about what doctors thought, and believed, and did, must all be viewed with that caveat in mind.

Despite these criticisms, Haller's book provides a stimulating and highly individual assessment of an extremely important era in American medicine. The bibliography and endnotes are voluminous and valuable.

Hannah Chair for the History of Medicine
Faculty of Health Sciences
McMaster University, Hamilton, Ontario

T. Grier Miller, M.D.
1886-1981

FRANK P. BROOKS, M.D.

DR. T. Grier Miller, emeritus professor of medicine at the University of Pennsylvania, died on November 15, 1981, at the Hospital of the University of Pennsylvania. His death brought to a close a career which extended over nearly a century. He was an academic leader in gastroenterology and internal medicine and a respected consultant in the practice of medicine.

Dr. Miller founded the gastrointestinal section of the Department of Medicine at the Hospital of the University of Pennsylvania in 1926 and continued to contribute to its support throughout his life. The Kinsey-Thomas, Thompson-Hawley and Lavino bequests were established by his patients. With William Osler Abbott he developed a long double-lumen intestinal tube which became an important factor in the study of small-intestinal physiology and in the treatment of intestinal obstruction and ileus. He supported the work of Dr. John Neefe, who with Dr. Joseph Stokes developed the concept of two major types of viral hepatitis. He organized a project for the study of vitamin deficiencies initiated by Dr. Katherine O'Shea Elsom and established a subsection of the gastrointestinal section in psychiatry which in 1949 was recognized by the Hospital of the University of Pennsylvania as the Department of Psychiatry.

As an educator he was responsible for the training of many physicians in gastroenterology. One of those he was very proud of was the late Dr. Franz Inglefinger, who referred to the Gastrointestinal Section as his "GI Alma Mater."

In 1930 with Dr. Alfred Newton Richards he made an extensive study of medical schools and their hospitals at the request of Dr. Thomas S. Gates, president of the University of Pennsylvania, as a guide to development of the medical school.

He served as president of a number of national organizations: the American Gastroenterological Association, the American College of Physicians, and the American Clinical and Climatological Association. In 1957 he received the highest award of the American Gastroenterological Association, the Friedenwald Medal. He was president of the Interurban Club in 1947. He organized the only meeting of the

International Congress of Internal Medicine to be held in the U.S.A. This meeting was convened in Philadelphia in 1958.

In Philadelphia he was the president of the Philadelphia County Medical Society and the Medical Board of the Hospital of the University of Pennsylvania. He was an active supporter of the Philadelphia Zoological Society and its Penrose Research Laboratory.

Dr. Miller became a member of the College of Physicians of Philadelphia in 1921. From 1949 to 1951 he served as its president. He was a member of the Board of Censors from 1957 to 1966 and again from 1974 to 1977. He was Chairman of the Pew Loan Fund Committee for Interns and Residents. He played an important role in developing financial support for the College, particularly in encouraging members to include support for the College in their wills.

Dr. Miller was born in Statesville, North Carolina in 1886. He graduated from the University of North Carolina in 1906. While an undergraduate he came under the influence of Horace Williams, a professor of philosophy whom he credited with encouraging him to become an independent thinker. After a year in the cotton business he found himself unhappy with his career and remembering a casual remark made by his kindergarten teacher that he should become a doctor, he decided to try out "on a purely exploratory basis" a single year in a medical school. He chose the School of Medicine at the University of Pennsylvania. After a year he became convinced that "medicine alone would satisfy certain curiosities and ambitions."

He retained permanently a strong interest in the University at Chapel Hill and in his family and friends in North Carolina. In 1943 his alma mater conferred upon him the degree of Doctor of Laws.

Dr. Miller received his M.D. from the School of Medicine, University of Pennsylvania in 1911. During his summer vacations he assisted a surgeon in his home town. He served in a two-year rotating internship at the Hospital of the University of Pennsylvania and purposely took extensive training in surgery. He planned a surgical career but by chance was offered and accepted the first fellowship in medicine established at the University; the salary was $400 a year. At the end of that year, Dr. Stengel's associate (in whose home Dr. Miller had been living along with Dr. Truman Schnabel) died and Dr. Miller took the position. This gave him an opportunity to take on some private practice and at the same time to conduct clinical activities in the hospital.

During his career at the Hospital of the University of Pennsylvania he wrote extensively on a wide range of subjects, from angioneurotic edema to bronchiectasis, and also on many topics in gastroenterology. His lectures to medical students were marked by clarity and completeness of clinical presentations. At the bedside and in the clinic he taught by example, emphasizing careful history-taking and physical examinations but above all, concern for the patient. The University of Pennsylvania recognized his accomplishments by dedicating to him the T. Grier Miller Plaza adjacent to the Medical Education Building and by creating the T. Grier Miller Chair in Medicine in 1977, held by the present Chief of the Gastrointestinal Section, Dr. Sidney Cohen.

This remarkable man served his University throughout his life. He led and supported many of the most cherished medical institutions in our country, including this college. Let us call his career to the attention of our younger colleagues and students as an example of what a dedicated physician and academician can accomplish.

Memoir of Herbert Reid Hawthorne
1894-1981

PAUL NEMIR, JR., M.D.

IN the early morning of Sunday, October 4, 1981, Herbert Reid Hawthorne, a Fellow of the College of Physicians for 34 years, passed away at the age of 87 at his home in Bryn Mawr. Dr. Hawthorne was born in Wahoo, Nebraska, in 1894. He attended Central High School in Philadelphia, and in 1919 received his medical degree from the University of Pennsylvania. His postgraduate training in surgery was at the Polyclinic Hospital (later to become the Graduate Hospital), at the Graduate School of Medicine, and at the University of Edinburgh.

Following his return from Edinburgh he was made Instructor in Surgery in the Graduate School of Medicine of the University of Pennsylvania. He was promoted to Professor in 1946 and the following year he succeeded Dr. Walter Estell Lee as chief of a surgical service at the Graduate Hospital. In 1954 he was made Chairman of the Department of Surgery in the Graduate School of Medicine and at the Graduate Hospital, a position he held until his retirement at the age of 65. These were particularly happy and productive years for him.

After retiring as Chairman of the Department of Surgery in the Graduate School of Medicine he accepted a position as consultant to the Veterans Administration. This second phase of his professional career occupied about eight years; even though it necessitated considerable travel up and down the Eastern seaboard and areas in the Western United States, he derived great satisfaction from his continued association with young surgeons and his continued endeavors in teaching. He was not only instrumental in helping to set up programs which assisted in the association between Veterans Administration Hospitals and local medical schools, but he also often taught in the surgical amphitheater.

At the age of 75 he began a third phase of his professional career. He accepted a position as consultant on the University of Pennsylvania Surgical Service at the Veterans Administration Hospital in Philadelphia and he continued as a consultant at the Graduate Hospital. He remained active in these endeavors until just a few months before his death. He received the greatest satisfaction in

working with the medical students and residents and this was reciprocated by them.

Dr. Hawthorne was a master surgeon and had a special interest in esophageal and gastrointestinal surgery. He made many contributions to the medical literature and was the author or co-author of more than 80 scientific publications covering a wide variety of subjects. He contributed chapters to numerous textbooks of surgery and gastroenterology and was co-editor of three textbooks concerned with surgery on the gastrointestinal tract and of the vascular system. He was responsible for initiating a strong surgical research program at the Graduate Hospital, and indeed, in the early stages personally supported the effort. He contributed significantly to the educational and training experience of hundreds of young surgeons from across the United States and from many foreign countries. Because of his warmth, charm, and easy accessibility he was held in great affection by all his students who attended the Graduate School of Medicine and he was usually the first person asked about whenever an alumnus was encountered.

His qualities as a teacher were unusual. He was not a dynamic or electrifying lecturer. He was generally shy and reserved and not given to ad-libbing or to commenting spontaneously. However, he had a special capacity to stimulate the students to ask questions and to seek answers that might easily have been overlooked. He had a special quality of gentleness which applied to his teaching, his attitude and conduct in the operating room and his relationship with colleagues. His greatest legacy was his unfailing optimism and faith in people.

Many honors were bestowed upon him. He was invited to give the Annual Oration at the Philadelphia Academy of Surgery in 1952. The Hawthorne Surgical Society was created in 1955 by his students in the Graduate School of Medicine and his residents at the Graduate Hospital. He was presented an award in recognition of his contributions to surgical education and research by the Association of Veterans Administration Surgeons during the 1974 meeting of the American College of Surgeons. He received the Strittmatter Award of the Philadelphia County Medical Society in 1972. In 1979, at the age of 85, he was awarded the Centennial Medal of the Academy of Surgery of Philadelphia in honor of his devotion to the ideals of that organization.

He was a member of many surgical organizations, among them the American College of Surgeons, the Society for Surgery of the

Alimentary Tract, the American Surgical Association, and the International Surgical Society. He was a member of the Sons of the American Revolution, the St. Andrews Society, and the Philadelphia Country Club. He is survived by his wife, the former Grace Briles, his daughter Jessica Hawthorne Contosta, and three grandchildren, all of whom were sources of such great joy and contentment to him. His stately and kindly presence will be greatly missed by this College.

History of the Founding of the Society of Surgical Chairmen

JONATHAN E. RHOADS

AT the 1981 meeting of The Society of Surgical Chairmen, which was held on November 2, 1981, the President, Dr. David B. Skinner, asked Dr. Jonathan E. Rhoads as the first President of the organization to describe the background of the formation of the Society and the objectives of the Society as they were perceived at that time. Since the meeting at which it was decided to organize such a society was convened in Philadelphia at the time of the Bicentennial of the Medical School of the University of Pennsylvania, it was thought that portions of this paper might be suitable for publication in the *Transactions & Studies of the College of Physicians of Philadelphia.* In response to President Skinner's request, various papers saved from 1965 to 1967 were looked up and certain excerpts seemed to provide the flavor of those meetings.

Perhaps this period is best summed up in the letter I wrote to Cheves Smythe on June 13th, 1967. At this time Dr. Smythe, who later became Dean of the Medical School at the University of Texas in Houston, was Associate Director of the Association of American Medical Colleges. The Society of Surgical Chairmen was an early participant in the Council of Academic Societies and Dr. Smythe had written, under date of May 24th, 1967, for a more complete statement about the Society of Surgical Chairmen. My reply reads in part:

> The Society of Surgical Chairmen grew out of informal meetings of the surgical chairmen, the first of which was held in Philadelphia in May, 1965. This was followed by another meeting in Atlantic City at the time of the Clinical Congress of the American College of Surgeons in the fall of 1965 and by a third meeting in March, 1966 at Boca Raton at the time of the American Surgical Association meeting. On this occasion a simple constitution and bylaws were adopted, a copy of which is enclosed. Officers were elected with the result that I am now serving as President, C. Gardner Child as Vice President and Clarence Dennis as Secretary/Treasurer. Under the constitution and bylaws, the officers serve for a period of two years and then move up. Thus, in May 1968 Child will become President and Dennis President-elect, and a new Secretary/Treasurer will be chosen who will serve in successive offices for a period of six years. At the meeting which was held in May, 1966 the invitation of the A.A.M.C. to become a member of the Council of Academic Societies was accepted. Dr. Child and I were elected to serve as representatives during the coming year. The criterion for membership which I have stated presently consists in holding a Chairmanship in one of our medical schools in the United States or Canada. The activities and fields of interest include all

> of those which concern departmental chairmen in surgery. The primary emphasis has been on undergraduate teaching but we are also concerned with training programs at the intern and resident level, with staffing patterns, with the recruitment at all levels including staff, with interdepartmental relationships and relationships between departments of surgery and the schools in which they exist and the relationships between both and the parent university. We have an obvious concern with all types of departmental financing, with hospital affiliations, with the interrelationships between staff and the governing boards of hospitals and broadly with anything affecting the conduct of patient care, teaching, research or administration in departments of surgery. In this connection we have had discussions and reports quite regularly on animal care legislation and its implications for departments of surgery.

The Society had, as a matter of fact, been approved for membership by the Executive Council of the A.A.M.C. January 25, 1967 and voted into institutional membership of the A.A.M.C. February 11, 1967.

We might go back now to the first meeting in May of 1965, since I have rather complete notes concerning it. The idea of such an organization first came to me in a letter from Dr. Howard Bradshaw, then Chairman of Surgery at the Bowman Gray School of Medicine, Wake Forest University.

The meeting of the American Surgical Association in Philadelphia in the spring of 1965 seemed to present an opportunity for many surgical chairmen to come together to talk about it without incurring additional travel expense. It was, therefore, decided to ask the chairmen to stay over a day and have a meeting on Saturday morning, May 15th after the A.S.A. Unfortunately, Dr. Howard Bradshaw could not come — I believe because he was receiving a foreign visiting professor — but he encouraged us to proceed.

Mr. Philip Allison, Professor of Surgery at Oxford, was attending the A.S.A. meeting and agreed to come and tell us about his experience with such an organization in Great Britain. This was during Lyndon Johnson's presidency and Michael DeBakey had presided over the committee which formulated the heart, cancer and stroke legislation. Indeed, he was in full cry lobbying for its passage by the Congress. He accepted an invitation to tell us about it and describe its implications.

My secretary has unearthed the formal letter of invitation sent on April 14, 1965 to all the surgical chairmen in the U.S. of whom we had a record. It read in part:

> There is evidence that the chairmen of departments of surgery in the medical schools of this country have a number of difficulties and it would

seem that some of these are problems which are widely shared. It was suggested to me a number of months ago that it might be a good idea if each person serving as a chairman could get together with other chairmen for a discussion of mutual problems.

My purpose in writing is to ask if you would be interested in staying over a day following the American Surgical Association meeting in Philadelphia. This would be Saturday, May 15th. I have reserved the Surgical Seminar Room at the Hospital of the University of Pennsylvania for a morning meeting, to begin at 9:00 A.M. While perhaps not ideal, I think this room will be adequate.

I think it would be well if someone would fill us in a bit on probable legislation in the health field. Among other important topics which might be discussed are: the place of surgery in the medical school curriculum, are university hospitals over-regulated by agencies outside the university, trends in the recruitment of surgical residents — viewed both quantitatively and qualitatively, the surgical mind and research, and the American image of a general surgeon.

If it would be possible for you to stay over, would you let me know? If a sufficient number are interested, we will hold a meeting.

Of those listed, only David Sabiston, Edward Woodward, George Zuidema, Isidore Cohn, James Hardy, Henry Bahnson and John Kirklin are still in the offices they held then, though a few have moved to other chairmanships and many are active in other ways.

Fifty-one accepted and forty-seven signed the roll. A photograph of the latter is reproduced herewith; the signatures may arouse recollections.

I believe I opened the meeting with the following statement, which indicates some of the concerns current in 1965.

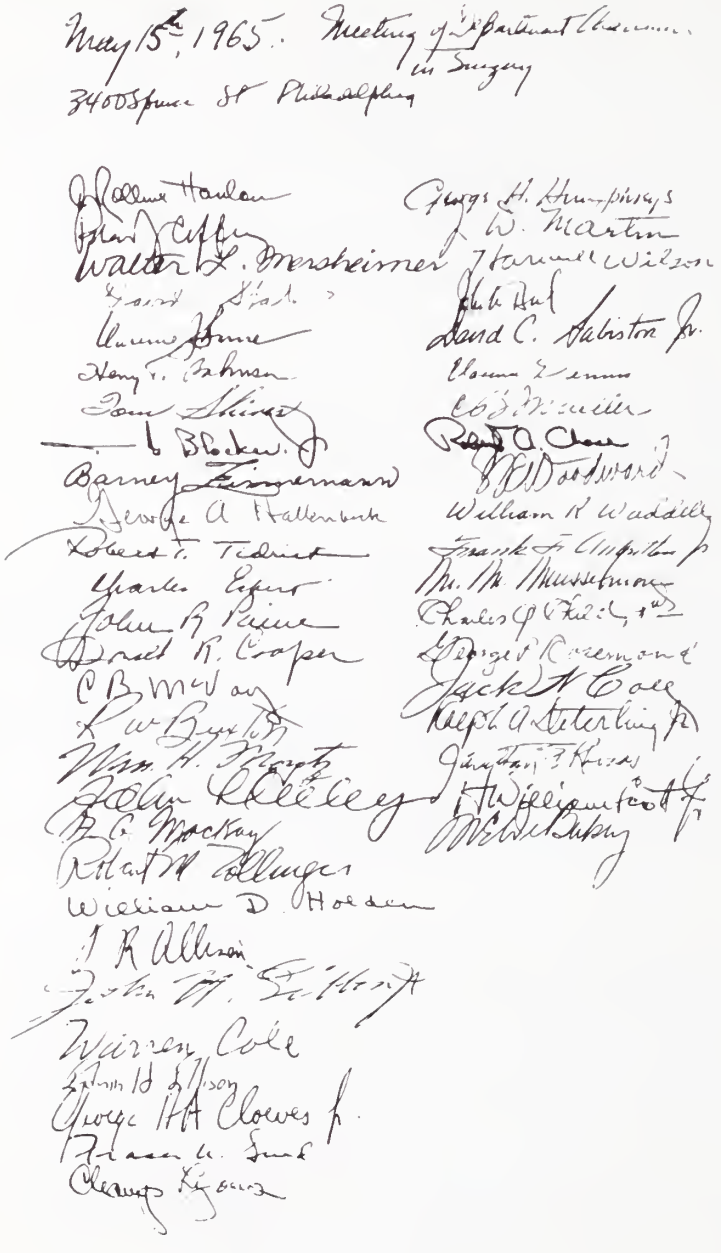
The thought of having a meeting of department chairmen was first expressed to me in writing by Howard Bradshaw more than a year ago. Unfortunately, he could not be here. The pressure of events seemed to make this more and more urgent.

I have spent much time with [J.] Garrott Allen, Henry Harkins and Carl Moyer because of our joint interest in a textbook. At one time we were all department heads but by a hair. Harkins had already locked horns with one dean in ways that would have probably led to a denouement for him if it had not been a denouement for the dean. Allen then had his troubles in Palo Alto and I was rather close to that. In Allen's case the dean rolled out the department head but since then the dean has had to resign. Harkins retired voluntarily.

If Carl Moyer adheres to his present decision by July, I will be the only one of the four of us who is still in office — if I am in office.

However, I don't believe the instability of departmental chairmanships is sufficient reason to hold a meeting of this kind. There will always be

May 15th, 1965. Meeting of Department Chairmen in Surgery
3400 Spruce St Philadelphia



J. Rollins Hanlon
Robert J. Coffey
Walter L. Mersheimer
David Stark
Clarence Hume
Henry T. Bahnson
Tom Shires
L. Blocker Jr
Barney Zimmermann
George A. Hallenbeck
Robert T. Tidrick
Charles Eckert
John R. Paine
Donald R. Cooper
C. B. McVay
R. W. Buxton
Wm. H. Moretz
John Kelley
A. G. Mackay
Robert M. Zollinger
William D. Holden
J. R. Allison
John H. Gibbon Jr
Warren Cole
Edwin H. Ellison
George H. A. Clowes Jr.
Frances W. Lund
Clemens Kjaerg

George H. Humphreys
J. W. Martin
Harwell Wilson
John Hall
David C. Sabiston Jr.
Clarence Dennis
C. B. Mueller
Robert A. Chase
B. H. Woodward
William R. Waddell
Frank F. Anderson Jr
M. M. Musselman
Charles Q. Child, 1st
George P. Rosemond
Jack N. Cole
Ralph A. Deterling Jr
Jonathan E. Rhoads
H. Williamson Jr
M. E. DeBakey

Those signing the register at the meeting of May 15, 1965 in Philadelphia.

Frank F. Allbritten, Jr., The University of Kansas

Philip Allison, Oxford, England

Henry T. Bahnson, The University of Pittsburgh

John M. Beal, Northwestern University

Clarence J. Berne, The University of Southern California

Truman G. Blocker, Jr., The University of Texas

R.W. Buxton, The University of Maryland

Robert A. Chase, Stanford University

Charles G. Child III, The University of Michigan

George H.A. Clowes, Jr., The Medical College of South Carolina

Robert J. Coffey, Georgetown University

Jack W. Cole, Hahnemann Medical College

Warren H. Cole, The University of Illinois

Donald R. Cooper, Woman's Medical College

Michael E. DeBakey, Baylor University

Clarence Dennis, State University of New York Downstate Medical Center

Ralph A. Deterling, Jr., Tufts University

Charles Eckert, Albany Medical College of Union University

Edwin H. Ellison, Marquette University

Fraser N. Gurd, Montreal General Hospital

George A. Hallenbeck, Scripps Clinic, La Jolla

John H. Gibbon, Jr., The Jefferson Medical College of Philadelphia

C. Hanlon Rollins, St. Louis University

William D. Holden, Western Reserve University

George H. Humphreys, Columbia University

John R. Keeley, Stritch School of Medicine of Loyola University

Champ Lyons, Medical College of Alabama

Albert G. Mackay, The University of Vermont

John D. Martin, Jr., Emory University

C.B. McVay, The State University of South Dakota

Walter L. Mersheimer, New York Medical College

William H. Moretz, Medical College of Georgia

C. Barber Mueller, State University of New York

M.M. Musselman, The University of Nebraska

John R. Paine, State University of New York at Buffalo

Jonathan E. Rhoads, University of Pennsylvania

George P. Rosemond, Temple University School of Medicine

David C. Sabiston, Jr., Duke University

H. William Scott, Jr., Vanderbilt University

G.T. Shires, The University of Texas

David State, Albert Einstein College of Medicine of Yeshiva University

Robert T. Tidrick, State University of Iowa

William R. Waddell, The University of Colorado

Harwell Wilson, The University of Tennessee

Edward R. Woodward, University of Florida

Bernard Zimmermann, West Virginia University

Robert M. Zollinger, The Ohio State University

local difficulties, always people who will resign rather than compromise the things they consider important, always a supply of younger men who will make a fresh try.

The more disturbing developments are an accentuation of the old spirit of separation between the disciplines reflected in the European tradition of separation of surgeons from the physicians. There are rumors that surgery should be taken out of the undergraduate curriculum or relegated to an elective and left to the post-M.D. years when it would be studied by those who intended to become surgeons only. Objections to this plan are first that many people, including myself, would never have found out that they would like to be surgeons. Still more serious is the fact that physicians generally would be less well informed and many would have a lack of knowledge especially in such fields as the acute abdomen, trauma, asepsis, supportive care and cancer, to mention only a few — a lack of knowledge critical for their patients.

Accentuating our problems are a decreasing belief in the dignity of labor typified by the title of a recent Benjamin Franklin lecture which was entitled, "The Exegesis of the Doctrine of Work," a withdrawal of the pure scientist from the applied scientist implied in constant reference to "basic" research, attempts to redefine research so as to leave out observations made outside a laboratory. Surgeons have often been a party to or at least an accessory to this last attempt.

General surgeons have made the mistake of pulling away on their part from the behavioral sciences including psychiatry which I think we should not have done. We are in the same boat with them so far as having to deal with biologic variability is concerned.

The surgical specialties have grown at the expense of much fissioning of surgery as a whole and this is a further source of weakness as contrasted with medicine which by and large has remained a cohesive discipline despite its 10 or 15 sections.

Part of our difficulties have stemmed from jealousy over remuneration or supposed remuneration.

The extreme positions are the unrestrained exploitation of an academic position to make money, which none of us would condone, and the unrestrained exploitation of the surgeon to carry a large load of private patient care to make money for the school and hospital which few of us would be interested in doing.

Between the two are many more tenable positions. Within limits, the poorer you are the more likely you are to be loved by your colleagues and the less likely you are to be respected in the community.

Another disquieting rumor is a proposal to give everybody a straight medical internship following which those who wanted to be surgeons could begin their training.

All of this drama is being played before a tremendous background of social change. Basic to this is the rapid increase in population which forces us to live close together, to depend more on the organization of our lives, in short to accept more government regulation and intervention. To this end we are offered the carrots labeled salaries, grants, and contracts if we do what is ordained by majority rule, or the stick of loss of salaries, loss of grants or even jail sentences if we do otherwise.

While Medicare is one phase of this, the more important items of pending legislation stem from the report of a presidential commission on heart disease, cancer and stroke which has become a best seller.

Perhaps we could do no better than call on Mike DeBakey to sketch for us these proposals which he did so much to develop that the best seller is widely referred to as the DeBakey Report.

After Mike's talk, which I hope will include other aspects of the legislative program of Congress also, I thought we might go around the room for each person's views on what he considers important for this group to concentrate on.

Perhaps our minimum objectives for today would be to decide 1) whether we should meet again, 2) when, and 3) what to place on the agenda.

Beyond this, we may want to consider a statement on the role of surgery in undergraduate education, or perhaps better, to address a proposal to the Association of American Medical Colleges asking for an institute before their annual meeting in 1966 which we could devote to a study of "the elements in surgical teaching which are of universal or general value to physicians and how best to teach them."

The agenda for such a session would be greatly influenced by the studies of Oliver Cope's committee of the American Surgical Association and those interested from the Society of University Surgeons.

The declared intention to hold it might stall off some of the hasty decisions which we hear rumored and give us time to assemble our forces and to regroup them where indicated.

A taped record of the morning's proceedings was kept and when transcribed, ran to 70 pages. Most of the first 25 were devoted to Dr. DeBakey's presentation and a detailed discussion of it.

Then Mr. Philip Allison was called upon to tell the group of his experience in Great Britain as a member of a surgical chairmen's organization and he spoke approximately as follows:

I'm afraid, gentlemen, that anything I might have to say might be rather old hat, as far as you're concerned. It might have been better if I'd listened to some of the problems that you're facing before mentioning some of our own, but I would like to set this stage — that the development of professorial units in medicine and surgery in the medical schools in our country have of course come up against the same sort of barriers and obstructions that I'd heard voiced in regard to medical schools here, and I imagine you've probably all had this experience, too. I find that there is a conflict between the status and security of an institution and the status and security and prestige of the individuals in the institution, because when it boils down to brass tacks, you find they most often take the concern of their own prestige rather than that of the hospital as a whole. This has certainly happened in individual hospitals with us and I imagine that this is the sort of thing that might happen

between your community hospitals and your medical schools and the problems that we've just been discussing where the Board of Trustees may be anxious to join up with the center but where the individual units of that hospital may feel their security so threatened that they don't want to subscribe to it. Well, I think I would like to say at this moment that some of the problems that the professors have had to face up to have — as it were — been done in the hospitals which have been running previously in a completely different way and, therefore, they came in as strangers; they came in, in a way, as competitors both for money and prestige and so on, and they came up against obstructions which, in human nature, one expects to come up against, more vicious in some cases than in others. What I do want to say is these problems have been felt so much by the people up and down the country to a variable degree that John Bruce and I got together and decided to have a conference of professors of surgery exactly as what you've organized here today, Dr. Rhoads, and we're supposed to meet once a year, and with particular problems we can meet more often. We meet to discuss academic problems — a scientific meeting in a sense — and the idea is that men just made professors of surgery in new institutions, and who are coming up against problems, don't have to fight their way through for 10 or 15 years in the same way that other people have had to do in the past, but that they may in fact get some moral support from the professors of surgery in the country as a whole, so that we have convened this meeting as we call it, "The Conference of the Professors of Surgery." It includes England, Scotland, Wales, Northern Ireland, and we just recently had a request from Southern Ireland to take part in this; and we hope in this way to bring our common problems to a forum where they can be discussed and from which we can issue memoranda of a general sort embodying what we think should be the position of a professional unit in a teaching hospital and so help one another. Now, many of these things of course you have already achieved. For example, your professor of surgery is head of the surgical department in the hospital. Now, in our hospital, the professor of surgery is head of his own little department, and he runs in parallel with the other surgical units of the hospital. He has no more or no less say than the others, and when he wants something for surgery in general or for the department in particular, he goes to the staff meeting, and he doesn't carry any more weight than a newly appointed demonstrator in biochemistry. This is the certain thing which we're up against now.

I think perhaps that's all I want to say about that situation for the moment, because I think you're discussing much more advanced problems, but it may be of interest to you that we formed this conference, that we meet regularly to try and influence Vice-chancellors and Heads of the Board of Trustees, etc. Thank you very much.

Later in the discussion Mr. Allison asked for a regular exchange of our conclusions with the Conference of Professors of Surgery in Great Britain.

If I recall correctly, John Gibbon was chairman of the committee which drafted the bylaws. There was one point in which I was never quite satisfied. As the bylaws were drawn and adopted, membership in the Society terminated the moment one's surgical chairmanship terminated. It seemed to me that this gave the administrative officers who appoint such chairmen the power to remove them from the Society of Surgical Chairmen. Presumably, this would never be the motive for firing the chairman of a department of surgery, but it does remove from the Society at once all of those who may have had the most bitter experiences with their central administrations.

I have wondered if it might not be wise to provide that members of the Society serve for a period of perhaps two years after the termination of their departmental chairmanships, so that their experience would remain available to the group as long as it was relatively fresh. As a matter of fact, I would seriously suggest that the bylaws might be amended along this line. I say this because some of our greatest problems have been with the abrupt removal of chairmen of surgical departments from office. Certainly, most successful chairmen have managed to keep good working relationships with the deans and vice-presidents and presidents under whom they work, but there have been times when these officers have been changed with devastating effects. Just as it has been reported that the deans keep tabs on surgical chairmen who have been successful in unseating other deans, it may be that the surgical chairmen should keep tabs on the administrators who have dealt negatively with other surgical chairmen. Not infrequently we are put in the position of serving on a search committee and supporting the nomination of an administrator who proves very difficult if not unreasonable subsequently. Furthermore, it is very difficult to obtain the kind of information one needs in advance so as to perceive the danger and perhaps to use one's influence in another direction.

In 1965 we asked the chairmen present to indicate the subjects which to them were of the greatest interest and we made a rough tabulation of the results. Unfortunately, there was a very wide spread in the areas of interest. In that year undergraduate teaching seemed to be dominant; about twenty persons listed this as important for the Society to explore. Six were concerned about total education in medicine, especially the process of shortening the required courses, six were concerned with problems concerning professional earnings, five with problems in postgraduate education at the residency level, four with difficulties associated with the multiplicity of affiliated hospitals, and four with an increased effort to upgrade our image, and smaller

numbers with a large variety of other subjects such as internships, town-and-gown problems, administrative loads, financing fulltime personnel, etc.

Accordingly the fall 1965 meeting was focused on undergraduate teaching in surgery and Dr. Berson, then head of the staff of the Association of American Medical Colleges, was invited to participate.

Among those present at the initial meeting there was a total concensus that we needed an organization of the chairmen. Fortunately, most of our subsequent meetings have emphasized constructive steps rather than what might be termed the common defense, and I think the Society has an increased opportunity to move in this direction as the result of the decision of the Whipple Society to turn over its functions in surgical education to the Society of Surgical Chairmen. I am sure it is good for the surgical chairmen to know each other and while you meet in many times and places there may be a certain advantage in meeting as chairmen.

Having reviewed this history, is there anything to conclude? First, I think there has to be a felt need to justify an extra organization and meeting. We did feel a need in 1965 and 1966. You have to ask yourselves if you still have any problems common to a considerable number of departments and whether they are problems in which an exchange of information or the formulation of a common position can be helpful.

Second, if the Society of Surgical Chairmen is going to assume some of the functions of the Allen Whipple Society in providing a forum for discussions of surgical education, it might well enlarge its membership or at least the number of its participants.

I have already pointed to certain advantages of continuing the membership of past chairmen for a couple of years.

One might also consider allowing the chairman to nominate one or two exceptional members of his department whom he considers to be ready to assume a chairmanship, for associate membership — probably passing the nominations through a membership committee. In this way, a group of associate members would come into being who could learn a great deal at the meetings of the group and who might contribute substantially to sessions on surgical education. Further, membership in this group might gradually gain recognition so that search committees for new surgical chairmen would come to give weight to such membership as an important credential. This might reduce to some extent the frequency of the surprise appointment of less qualified candidates.

It is not clear when the best time for meetings is. There is economy in tacking the meetings onto other national meetings. This does fairly

well for short meetings — perhaps up to half a day. On the other hand, it would seem worthwhile to try an occasional longer meeting independent of other commitments. Furthermore, a modest expansion of the number invited might prove to make a more critical mass, particularly if the younger group felt it to be something of an honor to be included, as I think they should.

I appreciate very much this opportunity to review the beginning of the Society and to do a little musing about future possibilities. As I have had the privilege of attending as a guest several meetings of the officers of the Society, I am tremendously impressed with the wide knowledge of the current problems which the president, Dr. David Skinner, his recent predecessors and his fellow officers possess, and the sophisticated way in which they are approaching them.

As more and more members retire as chairmen, it might be appropriate to consider the formation of a past chairmen's association parallel to that in medicine. Such a group, it is hoped, could meet concurrently with this Society but separately from it. This may be a better way of keeping past experience available to those who make the current decisions and may be better than extending the membership of retiring chairmen.

Finally I would say that with all its agonies, there is perhaps no academic post so rewarding as that of surgical chairman. I felt this so strongly in my early fifties that I resigned the Provostship of the University to become one, and I have never regretted it. I congratulate all those who have attained membership in the Society, and have full confidence that the future of academic surgery in America is in excellent hands.

School of Medicine
University of Pennsylvania
3400 Spruce Street/G1
Philadelphia, PA. 19104

Oliver Cromwell's Medical History

LEONARD JAN BRUCE-CHWATT

If parts allure thee, think how Bacon shined,
The wisest, brightest, meanest of mankind!
Or, ravish'd with the whistling of a name,
See Cromwell damn'd to everlasting fame!
— Alexander Pope, *An Essay on Man*, IV, 281.

OLIVER Cromwell is one of the most famous men in the history of England. Many things about him excite interest or passionate controversy.

The social, political, and economic background to Oliver Cromwell's rise to power during a popular revolt against privilege, at a time of growing intellectual rationalism and moral revolution, has been analysed by many historians. A recent commentator is Christopher Hill.[1] Cromwell as a man — his character, his personal life, his illnesses, and his death — still arouse inquisitive attention, perhaps because they are surrounded by some mystery and much fiction.

Abbott's[2] survey of writings on Cromwell lists 3500 books, articles, and other documents, including more than one hundred biographies. In most of the recent studies the cause of Oliver's death is said to be malaria,[3] while older sources refer to "tertian fever," "tertian ague,"[4] or

1. Christopher Hill, *God's Englishman* (London: Weidenfeld and Nicholson, 1970).

2. W.C. Abbott, *A Bibliography of Oliver Cromwell* (Cambridge, Mass.: Harvard University Press, 1929).

3. John Buchan, *Oliver Cromwell* (London: Hodder and Stoughton, 1934); M. Ashley, *Oliver Cromwell and His World* (London: Thames and Hudson, 1972); F.J. Cartwright, *Disease and History* (London: Hart Davies, 1972).

4. Sir Richard Baker, *A Chronicle of the Kings of England* (London: George Sawbridge, 1679); S. Carrington, *The History of the Life and Death of His Most Serene Highness Oliver Late Lord Protector . . .* (London, 1695); W. White Cooper, "Historical Note Concerning Certain Illnesses, the Death and Disinternment of Oliver Cromwell," *Dublin Quarterly Journal of Medical Sciences* 5 (1848): 339-70; C.H. Firth, "Oliver Cromwell" in *Dictionary of National Biography* (London, 1908) 13: 155-86.

to "bastard tertian ague."[5] Antonia Fraser's perceptive and well-informed biography stresses the difficulty of diagnosis from uncertain evidence and concurs with another conjecture about Cromwell's final illness.[6]

What is the likelihood that he died of a true malarial infection?

Oliver Cromwell was born in Huntingdon, Cambridgeshire, on 25 April 1599. Huntingdon, situated on the left bank of the river Ouse, lies within the vast area of Fenland, a stretch of lowland about 70 by 30 miles, which in olden times consisted of waterlogged swamps, pools, and lagoons. Drainage attempted by the Romans and by William the Conqueror proved unsuccessful. Since the ninth century the isolated areas of higher ground were occupied by monastic establishments. Some drainage was done near the monasteries for the purpose of cultivation; with their dissolution it was not maintained.

Little is known about Cromwell's childhood and youth. Buchan[7] tells us that he grew up as a strong country lad with rather heavy features and a large mole under his lower lip. His quick temper often changed from moodiness to sudden rage. In 1616 at the age of 17 he entered Sidney Sussex College at Cambridge. In June 1617 he returned to Huntingdon to manage the family estate, his father having died. At the age of 21, after spending some time in London in the study of law, he married Elisabeth Bourchier, daughter of a magistrate of that city. The marriage was happy; Elisabeth proved to be an excellent, loving wife and gave him the personal support and comforts of a well-run household. Oliver loved his wife devotedly for the whole of their married life. The young couple led a simple country existence. Oliver ate sparingly and drank little. He could be very merry, enjoying broad country jests. He rode heartily to hounds, and his hawks were a special pride. By 1628 he and Elisabeth had five children.

Yet something was wrong. In the early years of marriage Oliver consulted his physician, Dr. John Symcotts (or Simcott) of Hunting-

5. George Bate, *Elenchus motuum nuperorum in Anglia; or, A short historical account of the rise and progress of the late troubles in England*... Made English [by Archibald Lovell], 3 pts. in 1 v. (London: Abel Swalle, 1685).

6. Antonia Fraser, *Cromwell — Our Chief of Men* (London: Weidenfeld and Nicholson, 1973).

7. Buchan, op. cit. (note 3), p. 23.

don.[8] This we know from a statement in the *Memoirs* of Sir Philip Warwick (1701): ". . . He [Dr. Symcotts] assured me that for many years his patient was a most splenetic man and had fancies about the cross in that town and that he had been called up to him at midnight and such unseasonable hours very many times upon a strong fancy which made him believe he was then dying."[9]

Dr. Symcotts' testimony suggests that Oliver's medical problem at that time was psychological rather than physical. However, on 19 September 1628, Cromwell consulted a distinguished London physician, Sir Theodore de Mayerne,[10] whose case-book describes not only Oliver's state of mind ("valde melancholicus") but also states that his flesh was dry, and had lost freshness; that he had recurrent unyielding pains in his stomach three hours after meals; that the pains were exacerbated after Cromwell had taken the medicinal waters of Wellingborough; and that he had persistent pain in his left side.[11]

Were these physical symptoms the first signs of the renal calculi that were to plague Cromwell for the rest of his life? But Symcotts' comments and Mayerne's note also suggest that at this time Cromwell passed through a profound spiritual crisis.

8. F.N.L. Poynter and W.J. Bishop, eds., "A Seventeenth Century Doctor and His Patients: John Symcotts (1592?-1662)," *Bedfordshire Historical Records Society* 31 (1950-51): 21-23; also, W. Munk, *The Roll of the Royal College of Physicians of London* (London, 1878) 1: 228.

9. Sir Philip Warwick, *Memoirs of the Reign of King Charles I with a Continuation to the Happy Restoration of King Charles II* (London, 1701), p. 249.

10. Sir Theodore Turquet de Mayerne, a Protestant of French descent, was born in Geneva in 1573. He studied medicine in Heidelberg and Paris and received his M.D. degree in Montpellier. He settled in Paris, where he counted among his patients Henri IV of France. After the king renounced Protestantism and entered the Catholic Church, de Mayerne refused to change his religion and in 1606 left France for England, where he established a brilliant practice and became physician first to James I, then to Charles I and Queen Henrietta Maria. He was knighted in 1624 and died in 1655 after "having drank some bad wine at a tavern in the Strand." For a fuller biography see W. Munk, op. cit. (note 8), 1: 163-68; also *DNB* (note 4), 13: 150-52.

11. The original entry in de Mayerne's case book was as follows: "Mons Cromwell. Valde Melancholicus: corporis admodum sicci (et) exsucii, habens dolorem ventris periodicum, horis tribus a pastu, qui nullus hactenus cessit remediis. Num ultimo fuit exacerbatus a potu aquarum Willimburgensium. Fixus est in latere sinistro." Sloane MSS, British Museum, 2069 fol. 96B.

This major event has been stressed by most authors who studied Cromwell's life, particularly Buchan and Fraser.[12] It echoes the opinion of W.C. Abbott, one of Cromwell's most erudite biographers, who wrote: "Whatever the time and cause, he had apparently gone through that searching religious experience known as conversion; and for various reasons it would appear that it had been caused or accompanied by or had resulted in profound disturbances, emotional and perhaps physical."[13] This crisis in Cromwell's life was not what one might nowadays term a nervous breakdown, yet it reveals emotional agony followed by an almost mystical experience.

Nevertheless, Cromwell's "hypochondriasis" was attributed also to derangement of the biliary and digestive organs caused by the febrile disease that later came to be called malaria. He was living in a low marshy country and Dr. James Johnson (quoted by Cooper[14]) wrote:

> The periodical or occasional exasperations of the despondency [of "hypochondriasis"] . . . depend on some physical cause, probably atmospheric in the shape of malaria acting on a nervous system rendered unnaturally susceptible . . . During the last few years I have been able distinctly to trace . . . the disease in question to malaria, that is to the influence of a damp situation.

The quiet country existence underwent a change in 1628, when Cromwell was elected to Parliament and so became increasingly interested in local politics. In 1631 he left Huntingdon and leased a grazing farm at St. Ives, a few miles down the Ouse. There for five years he led an outdoor life, grazing his cattle on the good pasture of the marshy fields near the river and bringing up his family. On a winter Sunday he would wear a strip of red flannel round his neck, for his throat was weak.[15]

In 1636 he moved to Ely in Cambridgeshire, where he had inherited a house and lands from his uncle. There, in wide-open country that lies only a little above sea-level and is flooded regularly in winter, he was soon involved in the controversy about the draining of the Fens. In

12. Buchan, op. cit. (note 3), p. 66; Fraser, op. cit. (note 6), p. 37.

13. W.C. Abbott, *Writings and Speeches of Oliver Cromwell*, 4 vols. (Cambridge, Mass.: Harvard University Press, 1937-47), 1: 64.

14. Cooper, op. cit. (note 4), p. 341.

15. Buchan, op. cit. (note 3), p. 90.

Death mask of Oliver Cromwell, 1658. National Portrait Gallery, London.

Oliver Cromwell. Painting by Peter Lely, ca. 1654. City Museum and Art Gallery, Birmingham.

1630, Francis, Earl of Bedford, and a group of landowners known as Adventurers, secured the right to reclaim the marshes near Ely. A straight canal twenty miles long was cut through the lowland, to cover the water-table and to create arable fields and pastures. This was bitterly resented by the Fenmen, whose amphibious life of boating, fishing, fowling, and reed-cutting was threatened. Moreover, the local people were given little if any compensation for the change in their environment. By 1637, an immense acreage of common land was claimed by the Earl of Bedford's syndicate and riots ensued. Oliver took up the cause of the commoners. A year later Charles I declared that the work was incomplete; thus the Fenmen could remain in the possession of their customary rights for the time being. Cromwell, whose enemies labelled him "the Lord of the Fens," was not opposed to the reclamation of this large swampy area, and in 1649 advocated completion of the work.[16]

Oliver's defence of the people won much acclaim, and in 1640 the borough of Cambridge returned him to Parliament. The Cromwells moved to London, Oliver's political ascent having started in earnest. Most biographers describe his physical appearance at this point of his life. Sir Philip Warwick writes: "His stature was of good size, his countenance swollen and reddish, his voice sharp and untuneable, but his air was manly, his look stern, his eye bright and his eloquence full of fervor".[17] Fraser's description, based on a portrait painted by Walker in the 1640s, is particularly evocative.[18] "A high-cheek-boned face with a lofty forehead framed by long chestnut-brown hair, a ruddy complexion, the mouth well formed, the nose prominent but fine, bony across the bridge; the heavy-lidded eyes have a nervous, almost apprehensive expression, an introvert look of the pilgrim soul. The famous warts were in the left eye-socket, under the lower lip, and most prominently above the right eye-brow."

16. The remarkable work on the reclamation of some 2300 square miles of southern and northern Fens during the seventeenth to nineteenth centuries is told in detail by H.C. Darby, *The Draining of the Fens* (Cambridge: the University Press, 1940); see also George M. Trevelyan, *Illustrated English Social History*, 4 vols. (London: Longmans, Green, 1942-), 2: 83-86.

17. Warwick, op. cit. (note 9), p. 247.

18. Fraser, op. cit. (note 6), pp. 62-64.

Cromwell's health in 1642-1655

Cromwell's military career started in 1642, when the King raised his standard at Nottingham. In response to this event Cromwell was ordered by Parliament to assemble the cavalry force, to which he was promoted Colonel. At the Battle of Winceby (11 October 1643) his horse was hit under him during a cavalry charge, but he was unhurt. It also seems that he was wounded slightly in the neck during the siege of York a year later. His determination and military genius turned defeat into victory at Marston Moor and won for the Parliamentarians the decisive battle at Naseby. He was now Lieutenant-General and recognized as the greatest soldier in England.

In 1646, the king's flight and the surrender of Oxford closed the first phase of the Civil War. Cromwell and his family[19] settled in London, and he became active in the House of Commons. During the crisis of 1647 between the Army and Parliament, Cromwell became seriously ill. The official statement was that he had "an impostume in the head," but the probable background was mental strain and depression that lasted for a long time after the physical illness had ended.[20] The dramatic events of the next two years culminated in execution of the king. However reluctant he might have been at the beginning of the trial, Cromwell soon convinced himself that the king's death was an act of divine justice.

In June of that fateful year of 1649, Cromwell, now the first chairman of the Council of State, agreed to lead a force to Ireland to protect the new Republic. The Irish campaign with its cruel massacres of Drogheda and Wexford tarnished Cromwell morally and greatly affected his health. In October an epidemic of "country malaria" broke out among the troops. "I scarcely have one officer in 40 amongst us that hath not been sick and how many considerable ones we have lost is no little thought of heart to us" wrote Cromwell.[21] At Ross he fell very ill, quite

19. Cromwell had eight children of whom seven (three boys and four daughters) survived to adulthood, but one boy (Robert) died at the age of 17 from either a fever or an accident, while another (Oliver) died of smallpox at the age of 21.

20. Abbott, op. cit. (note 13) 1: 426-28.

21. Thomas Carlyle, *Oliver Cromwell's Letters and Speeches*, S.C. Lomas ed., 3 vols. (London, 1904), 1: 486-87. The term "country malaria" was often misapplied in the nineteenth century to epidemic outbreaks. The disease that affected Cromwell's army in Ireland was probably typhus. According to Sir William MacArthur in his "Brief Story

"crazy" as he described it in a letter to Richard Mayor, his son Richard's father-in-law.

There is no evidence that he had what we now recognize as typhus or relapsing fever, those common epidemics of wars, but the probability is strong. Cromwell did not recover until late November, and the illness combined with physical exertions, privations, and mental anguish must have injured even his iron constitution. But he soon marched again toward Waterford despite appalling weather and despite a continuing sickness among the troops, who sustained about one thousand deaths from "fluxes and fevers." By the end of the year much of the coast of Ireland was in Cromwell's hands. After the surrender of Clonmel in May 1650 he returned to London.

In 1650, Cromwell, now General and Commander-in-Chief of the Armies of the Commonwealth, led his troops to quell the Scottish "rebellion." The campaign was fought in dreadful weather, with constant rain and snow, in a land stripped of food and forage by the Scottish guerilla fighters. The parliamentary army lost nearly half of its original strength of 15,000 through sickness. However, the battle of Dunbar was decisive. The victorious Cromwell now controlled Edinburgh.

The Scottish campaign broke Cromwell's health. In September 1650, he wrote to his wife: "The Lord hath showed us an exceeding mercy; who can tell how great that is! My weak faith has been marvellously supported; though I assure thee I grow an old man and feel infirmities of age marvellously stealing upon me."[22] In February 1651 he fell ill after marching from Kilsyth in a snowstorm. Brought back to Edinburgh, he had three severe feverish attacks during the next three weeks. Not until the end of the month was he able to plan the campaign with his officers. Even then he apparently felt "a little crazy," a word that he had used previously in Ireland. "It was his old enemy the ague of the fens [writes Buchan[23]] and he was weakened by nearly 3 years of heavy physical toil." Cooper quotes a letter from Edinburgh: "My Lord General since his last march has been sick of the country disease . . ." Another letter, dated 25 February, says: ". . . my

of English Malaria", *British Medical Bulletin* 8 (1951): 76-79, Buchan confounded "the country disease" (dysentery) and the "Irish ague" (typhus) and then identified the resulting amalgamation as a form of malaria native to Ireland.

22. Carlyle, op. cit. (note 21) 2: 224.

23. Buchan, op. cit. (note 3), p. 388.

Lord General hath had an indisposition of body hanging upon him ever since our last march and still he continues a little crazy." The information on 4 March is: "... my Lord Generall, since he was sicke, hath been abroade and went to Leith, but came back not well again, so he hath entered into a course of Physic, but God be blessed pretty chearfull, but loathe at present to venture abroade, for fear of catching cold as yet, untill he hath gotten more strength."[24]

Three letters addressed to "Lady Cromwell" from an unnamed man who attended her husband in Scotland give more details: "Honourable Madam, My Lord took his rest very well on Tuesday night last and so (blessed be God) he hath done every night, and sometimes in the daytime also; so that he is better sensible both in Dr. Goddard's judgement and also in his own, hath a better stomach and grows stronger . . ." On 28 February we learn that "the physitians that are about my Lord General Cromwell have been so careful of recovering his health, that they have kept him from being troubled with any publike business and now he gathers strength apace and walks about."[25]

Since there were rumours that he was dead, Cromwell ordered a trumpeter to be brought into his presence, to carry back the news that the commander was alive and convalescent.

By the end of March he had recovered fully, to the great relief of the army. On 24 March, 1651, aware that his illness had been severe, he wrote to Bradshaw, Lord President of the Council: "My Lord, — I do with all humble thankfullness, acknowledge your high favour and tender respect to me, expressed in your letter, and the express sent therewith to inquire after one so unworthy as myself. Indeed, my Lord, your service needs not me, I am a poor creature, and have been a dry bone, and am still an unprofitable servant to my master and you. I thought I should have died of this fit of sickness; but the Lord seemeth to dispose otherwise . . ."[26]

24. Cooper, op. cit. (note 4), quotes from *Several Proceedings in Parliament*, 13-20 February and 6-13 March 1651; also from *Perfect Summary of Exact Passages* 21-28 March 1651.

25. The anonymous writer of these letters was probably Cromwell's French valet Jean Duret; Cromwell, while ill, would take food only from Duret's hands. Duret himself fell sick, perhaps from exhaustion, and it was Cromwell's turn to visit him assiduously, but Duret did not recover. In his last words, he commended his mother and sister in France to his master's care. Cromwell complied very generously. See Abbott, op. cit. (note 13) 2: 395; Fraser, op. cit. (note 6), p. 379.

26. Carlyle, op. cit. (note 21) 2: 302.

Cromwell soon took to the field again and stayed with the army until May, when he brought his forces back to Edinburgh. Apparently during this short campaign he again was tormented by a urinary calculus. A letter from Berwick dated 4 May 1651 reads: "The Lord General hath been ill of the stone, but blessed be God, is now again well and chearful. His Excellency is returned with the army to Edinburgh to their old quarters."[27]

However, these hopes were premature, since he was once again seized by an "intermittent fever," which brought him close to the grave. This attack started about 10 May, 1651. The contemporary account, probably by Cromwell's new valet, Charles Harvey, describes it vividly:

> Being at Edinburgh, in Scotland, it pleased the Lord to exercise him with sore sickness, a high and dangerous Feavor, whereby he was brought so low that his physicians and others had little or no hopes of his recovery; for one fit of his distemper having lasted about twelve hours; immediately a second fit returned upon him without any intermission for as long a time, and likely to have continued in that extremity, until thereby he had expired. But behold . . . to the astonishment of himself and others, it being little less than a miracle; for his distemper returned no more upon him.[28]

Another letter gives additional details:

> I bless God that I can give you some more comfortable information concerning my Lord's health, than I did in my last. From Friday night till Monday at 12 of the clock at night, he had five fits of an ague. But Monday at night he had none, but rested and slept well; and this day he is quiet and comfortable, and now and then sleeps. His lips brake out about six at night which is a good sign of recovery. I waited on him on Thursday. If it please God he escape his fit this night we may hope the worst is past for this bout . . . This is the third relapse since his first great sickness which was contracted by a winter's march. My Lord is not sensible that he is grown an old man. But if it please God to restore him now (of which we doubt not), I hope we shall prevail with him to favour

27. *Several Proceedings in Parliament*, 8-15 May, 1651.

28. *An Account of the Last Hours of the Late Renowned Oliver Lord Protector . . . Drawn up and published by one who was an eye and ear-witness to the most part of it* (London, 1659), p. 8; quoted by Cooper, op. cit. (note 4), p. 350.

> himself. This air is not so suitable to his temper as that of England. All thoughts of his marching with the army at their first going out is laid by; and the officers provide accordingly to manage their business without his personal presence.[29]

This news caused much concern in Parliament. On 27 May, Dr. Bate and Dr. Wright, Cromwell's physicians in London, received orders to proceed at once to Scotland to take care of him. They arrived on 30 May, but it appears that in the meantime their patient had improved. A letter from Edinburgh dated 31 May 1651 says: "It is a great gladness to our hearts that the Lord is pleased to be so merciful to us in the renewed health of my Lord Generall. He eats and sleeps well, and walked yesterday very cheerfully in the garden at his own quarters, and gaineth strength apace. Dr. Wright and Dr. Bates [sic] came hither yesternight and, as they deserved, were exceeding affectionately entertained by my Lord."[30]

Cromwell greatly appreciated the consideration shown him. In a letter of 3 June 1651, addressed to John Bradshaw, Lord President of the Council, he wrote:

> My Lord, — I have received yours of the 27th of May, with an order from the Parliament for my liberty to return into England for change of air, that thereby I might the better recover my health, all of which came unto me whilst Dr. Wright and Dr. Bates, whom your Lordship sent down, were with me. I shall not need to recite the extremity of my last sickness. It was so violent that indeed my nature was not able to bear the weight thereof. But the Lord was pleased to deliver me beyond expectation, and to give me cause to say once more, "He hath plucked me out of the grave."[31]

By 5 June, Cromwell ordered the army to move, and he rode with it in his coach. While the army pursued the Scots across the Firth of Forth, the Scottish royalist forces entered England, reached Carlisle by August, and proclaimed Charles II the rightful sovereign. In a remarkably fast

29. *Perfect Diurnall* 26 May-2 June 1651, quoted by Cooper, ibid., pp. 350-51.

30. *Mercurius Politicus* 5-12 June 1651. The two doctors received £200 for their trouble, according to Abbott, op. cit. (note 13) 2: 421.

31. Carlyle, op. cit. (note 21) 2: 310.

countermove Cromwell, having left some of his troops in Scotland, brought the bulk of his army into Yorkshire, and after a forced march blocked the king's advance.

After dividing his force he was able to attack the royalists at Worcester from both sides. A bridge of boats was thrown across the Severn, south of the town. Cromwell in person led the way. On 3 September, after dreadful carnage, the battle was won. For a man only three months after a nearly fatal illness, the achievement was remarkable not only from a military but also from a medical point of view.

From the end of 1651, Cromwell lived in official residences in Whitehall and at Hampton Court. In 1652 he was greatly upset by the death of Henry Ireton, his friend and son-in-law, a victim of plague.

Social unrest at home and political strains abroad were intense during the next two years. Antagonism between army leaders and civilian members of the Rump Parliament led to dissolution of the House of Commons. In September 1654, Cromwell, now Lord Protector of the Commonwealth, addressed the new Protectorate Parliament.

Throughout the next year there was much trouble, since the Protectorate Parliament would not agree to the constitution approved by the leaders of the army, and in January 1655 the House was dissolved. In addition, the colonial venture in the West Indies was not a success; although Jamaica was captured, thousands of English soldiers were killed, or died of tropical diseases.

In September the Protector suffered agonies from urinary calculi and consulted Dr. Moleyns, a well-known lithotomist at St. Bartholomew's and St. Thomas' Hospitals in London. It seems that Moleyns' treatment improved Cromwell's condition without any risky surgical procedure.[32] By the end of 1655 Cromwell was a changed man. Every few weeks he had an attack of illness. His writing had become shaky and his hands trembled when he greeted foreign visitors.[33] Nieuport, the Dutch Ambassador, applying to the Secretary of State for an audience, was informed that, "the Lord Protector found himself a little better than before, but that he daily still continued to take physic; and

32. Th. Carte, *A Collection of Original Letters and Papers Concerning the Affairs of England from the Year 1641 to 1660*, 2 vols. (London, 1739) 2: 80, quoted from Fraser, op. cit. (note 6), p. 575. See also George C. Peachey, "Thomas Trapham, Cromwell's Surgeon and Others," in *Proceedings of the Royal Society of Medicine* 24, pt. II (1931): 1441-48.

33. Buchan, op. cit. (note 3), p. 388.

that the physicians had desired him to abstain as yet, as much as possible, from consultations of state; that accordingly, neither the Council nor he had dared trouble him in the least."[34]

In 1656 he suffered from the periodic misery of gout and in January of that year he had a painful boil. All this made him short-tempered and gave rise to royalist rumours that he was of unsound mind.

The Venetian ambassador reported that although Cromwell was preoccupied and his health was unstable, he still was resilient, and had a majestic and even martial appearance. His complexion was still ruddy, though his beard had become scanty. From another source we know that his teeth were good and his eyes had deep expression. In the spring of 1657, having finally refused the offer of a crown, Cromwell attempted to govern with the help of the second Protectorate Parliament, but in February 1658 he lost his temper and peremptorily dissolved the House. The troubles of that period had an adverse effect on his health. It was now rumoured that he suffered from insomnia and took laudanum, which dimmed his mind, and that he avoided seeing people and even his family. It may be true that he suffered from headache and dizziness and sent for a surgeon to deal with a painful "imposthume" on his back.

The constant threat of conspiracy contributed to the tension that surrounded the Protector in this last year of his life.

Cromwell's last illness and death

The year 1658 proved especially distressing. The hot summer was very unhealthful. Malignant fevers raged and a day of public prayers was ordered. In addition to the heavy responsibilities of his office, Cromwell was constantly menaced by plots against his life, such as those by John Gerard and Miles Sindercomb. A proclamation promised in the name of Charles II a knighthood and £500 a year "to the slayer of a certain base mechanic fellow Oliver Cromwell." He had lost his old and trusted friend, the Earl of Warwick, and also Robert Rich, the husband of his youngest daughter. His beloved elder daughter Elisabeth Claypole had lost her little boy Oliver and was very ill at Hampton Court. Cromwell seems to have upset her greatly by executing an Anglican clergyman, Dr. Hewet, for high treason, although she had pleaded on his behalf. Ominous portents were reported in the newspa-

34. John Thurloe, *A Collection of State Papers of John Thurloe, Esq.*, ed. Th. Birch, 7 vols. (London: Woodward and Davis, 1742) 4: 18.

per and were spread by superstitious people. Cromwell himself suffered from gout, backache, and insomnia aggravated by his anxiety for Elisabeth, who had been wasting away for more than a year from what appears to have been cancer of the uterus, described by Dr. Bate as "an inward imposthume of the loins," which caused great agony. She died on 6 August 1658.

On 17 August the Protector, although prostrate with grief and suffering from abdominal pain, rode at the head of his Life Guards in Hampton Park, where George Fox, the Quaker, saw him and was shocked by his appearance. "I saw and felt a waft of death go forth against him; and when I came to him he looked like a dead man."[35]

The next day Fox went to Hampton Court Palace to speak to the Protector, but the physicians would not allow Cromwell to be disturbed. On the previous night he had been attacked by fever and backache. A letter of 24 August from Secretary Thurloe to Henry Cromwell, Oliver's youngest son, describes these events.

> I was necessitated to omit writing by the last post, being obliged to attend my Lady Elizabeth's [Mrs. Claypole's] funeralls, shee being this day se'nnight at night interred at Westminster, whither she was carryed from Hampton Court. Your Lordship is a very sensible judge how great an affliction this was to both their Highnesses, and how sadd a familye she left behind her, which sadnesse was truly very much encreased by the sicknesse of his Highnesse, who at the same tyme lay very ill of the gout and other distempers, contracted by the long sicknesse of my lady Elizabeth which made great impressions upon hym; and since that, whether it were the retiringe of the gout out of his foot into his body, or from some other cause I am not able to say, he hath beene very dangerously sicke, the violence whereof last 4 or 5 dayes, but blessed be God he is now reasonably well recovered, and this day he went abroad for an houre, and findes himselfe much refreshed by it.[36]

The improvement was brief. The fever returned, and on 24 August Cromwell's five doctors[37] advised him to return to London. Cromwell's symptoms were not so severe as to prevent him from taking

35. George Fox, *Journal*, ed. N. Penney (Cambridge, 1928) 1: 337.

36. Thurloe, op. cit. (note 34) 7: 320.

37. The five doctors who attended Cromwell during his last illness were: George Bate (or Bates), Lawrence Wright, Thomas Trapham, all three State physicians. John Bathurst and Jonathan Goddard were also in attendance but they were only occasionally called. See Munk, op. cit. (note 8) 1: 181, 222, 228, 240, 345.

brief walks during the next few days. But one day "when suddenly startled, he looked pale, fell in a cold sweat, almost fainted away and ordered himself to be carried to bed, where being refreshed with cordials he made his Will."[38]

The following day he reproached his physicians for looking so despondent. Holding his wife by the hand, he said: "I tell you I shall not die this bout, I'm sure of it." To the physicians he said: "Don't think I am mad, I speak the word of truth upon surer grounds than Galen or your Hippocrates furnish you with; God Almighty himself hath given that answer not to my prayers alone, but to all the prayers of those who entertain a stricter commerce and great intimacy with him. Go on cheerfully banishing all sadness from your looks and deal with me as you deal with a serving man . . .".[39]

During the next few days Cromwell's health deteriorated steadily. Dr. Bate diagnosed the illness as "slow fever that at length degenerated into 'bastard tertian ague'." On Friday 27 August, Cromwell had severe cold and hot fits. By the beginning of the next week he was still worse. On the night of 30 August a tremendous storm broke over England. Large trees were torn up by the roots in St. James' Park and many houses were unroofed. All this stirred the imagination of the people. Some believed that Cromwell had been carried away by the hurricane.

On 30 August, Thurloe wrote again to Henry Cromwell:

> I gave you some account by Doctor Worth of his Highnesse's condition as it then was; but least he should delay his journey or miscarry in it, I thought it was necessary to send this expresse, to the end your excellencye may fully understand how it is with his Highnesse; this is the thirteenth day since his ague took him, havinge beene sicke a fortnight before of a generalle distemper of body. It continued a good while to be a tertian ague, and the burninge fits violent. Upon Saturday it fell to a double tertian havinge two fitts in twenty-four hours; one upon the

38. Bate quoted by Cooper, op. cit. (note 4), p. 359; Thurloe, op. cit. (note 34) 7: 363, tells us that attempts were made to obtain the secret sealed paper in which Cromwell was said to have designated his successor but the document was never found, although the Hampton Court palace was searched thoroughly. See also Fraser, op. cit. (note 6), pp. 669-70.

39. Cooper, op. cit. (note 4), p. 359, who abstracted this from Dr. Bate's narrative, has justified doubts about the latter's veracity.

> heeles of another, which doe extremely weaken hym and endanger his life; and truly since Saturday Morning he hath scarce been perfectly out of his fitts. The Doctors are yet hopefull that he may struggle through it, though their hopes are mingled with much feare.[40]

A letter written on the following day, also addressed to Henry Cromwell, indicates Thurloe's fear of the fatal outcome: "I did by Dr. Worth upon friday, and by an Expresse yesterday, certifie your Excellencye of his highnesse condition; since which, things with him remeyne much as they did, if he doth not declyne more and more. Wee are willinge to hope the best, but truly he is in great daunger, and he is soe weake for the present that he is capable of doeing nothinge respectinge to the Publique."[41] Another letter of the same date from General Charles Fleetwood to the Lord Deputy of Ireland says:

> The Lord's hand hath bene very sorely upon us in the continuance of his Highness under a very great distemper, called an ague, but mostly his heat gave us the sadd aprehension of danger he was under: and truly little hopes as to man was, but the Lord is pleased to give some little reviving this evening. After a few slumbering sleeps, his pulse better, his water good all this day till now at night there hath been very great fears what the wombe of tomorrow might have brought forth.[42]

But a letter written to Henry Cromwell on the same date by Lord Fauconberg, Mary Cromwell's husband, left no hope: "Tis with unexpressible grief that I now give your Lordshipp the sad account of his Highnesse's condition, which all the physitians have for some days judged dangerous, and now more than ever." "Tuesday, Augt. 31.—Z. [the Protector] is now beyond all possibility of recovery."

During the next three days there was little change. On Thursday 2 September the doctors declared that the patient could not survive another day. On that evening Thurloe and four or five members of the

40. Thurloe, op. cit. (note 34) 7: 363.

41. Ibid. 7: 366.

42. Ibid. 7: 367.

Council gathered round Cromwell's bed. It is believed that he whispered the name of his elder son Richard as a successor. But Oliver was by then "in a drowsy fit" and no one is certain what he said.[43]

Charles Harvey, the groom to the bedchamber, tells us that throughout that day Cromwell was very restless, speaking to himself and exclaiming "God is good" with "much cheerfullness and fervour of spirit in the midst of his pains."[44] Dr. Bate, who was at Cromwell's bedside throughout the night, described the last hour as follows: "He was very restless most parts of the night, speaking often to himself; and there being something to drink offered him, he was desired to take the same and endeavour to sleep. Unto which he answered: 'It is not my design to drink or sleep; but my design is to make what haste I can to begone'."[45] By the morning of Friday, 3 September 1658 the Protector was speechless. He died at 3:45 that afternoon.[46]

On 4 September 1658 the *Mercurius Politicus* announced that physicians and surgeons were appointed by order of Council to "embowel and embalm the body of the late Highness." But on 3 September at night the autopsy had already taken place; perhaps poisoning was suspected.

The following account of the autopsy was made by Dr. Bate:[47]

> Dissecto cadavere, in *Animalibus* partibus vasa cerebri justo pleniora videbantur; in *Vitalibus* pulmones aliquantisper inflammati; sed in *Naturalibus* fons mali comparauit: *Liene*, licet ad aspectum sano, intus tamen tabo instar amurcae referto. Corpus etsi exenteratum, aromate

43. Fraser, op. cit. (note 6), p. 675.

44. *A Collection of Several Passages concerning his late Highnesse Oliver Cromwell, in the time of his sickness; wherein is related many expressions upon his death bed. Together with his prayer two or three Dayes before his death. Written by one who was the Groom of his Bed Chamber* (London, 1659).

45. Bate, op. cit. (note 5), pt. 2, p. 417.

46. Sir Richard Baker's brief summary of Cromwell's illness and death is of interest: "After a while he fell sick himself of a *Tertian* fever which at first seemed not to signify much damage but by degrees it grew upon him: yet his Imagination was so far transported by enthusiastic ravings . . . it was advised he should be brought to Whitehall . . . e're it visibly appeared he had but a few more days to live . . . On Thursday, 2nd September, perceiving his Distemper very much to increase and hourly gain upon him . . . Friday at three of the clock in the afternoon he departed this life. He died in his Bed a natural death." Richard Baker, *A Chronicle of the Kings of England from the time of the Romans government unto the Raigne of our Soveraigne Lord King Charles I.* . . . (London, 1679).

47. George Bate, M.D., *Elenchi motuum nuperorum in Anglia pars prima simul ac juris Regii & Parlamentarii brevis enarratio . . . recognita & aucta . . . anno 1660* (London, 1661), pt. 2, p. 417.

> repletum, ceratisque sextuplicibus involutum, loculo primum plumbeo, dein ligneo fortique includeretur, obstacula tamen universa, perrumpente fermento, totas perflavit aedes adeo tetra mephiti, ut ante solennes exsequias terrae mandari necessarium fuerit.[48]

It is not known whether Dr. Bate's decision to bury the corpse so hastily was due to fear of contagion or to other reasons.

Cromwell's fatal malaria — true or false?

After 400 years any attempt to diagnose Cromwell's final illness must be based largely on guesses. Nevertheless, much historical information is available and can be used to form a conjecture.

At this distance in time even the terms used for symptoms such as the fit, the distemper, the imposthume, or the flux may be misleading. The state of healing arts in the seventeenth century was not greatly different from that of the sixteenth and much of the description of Tudor medicine is applicable to the times of the Stuarts.[49] In sixteenth- and seventeenth-century England the terms "marsh fever," "intermittent fever," "tertian or quartan fever," and especially "ague" covered a large number of febrile diseases. The same applies to the term "malaria," which was introduced in the eighteenth century and which for some 100

48. The translation of this report given by Archibald Lovell (see Bate, op. cit. [note 5], pt. 2, p. 236) reads as follows: "His Body being opened: in the *Animal* parts the Vessels of the Brain seemed to be overcharged; in the *Vitals* the Lungs a little inflamed; but in the *Naturals* the source of the distemper appeared; the *Spleen*, though sound to the Eye, being within filled with matter resembling the Lees of Oyl . . . Though his Bowels were taken out and his body filled with Spices, wrapped in a six-fold Cerecloath, and put first into a Coffin of Lead, and then into a Wooden one, yet it purged and wrought through all so that there was a necessity of interring it before the Solemnity of the Funerals." Part of this translation by Lovell (quoted by Karl Pearson and G.M. Morant, "The Wilkinson Head of Oliver Cromwell and Its Relationship to Busts, Masks and Painted Portraits," *Biometrika* 26 [1935]: 374-77) does not correspond with the Latin text, since "perflavit aedes adeo tetra mephiti" should have been rendered as "foul stench pervading the whole house."

49. Charles Webster, ed., *Health, Medicine and Mortality in the Sixteenth Century* (Cambridge: the University Press, 1979). See also L.J. Bruce-Chwatt, "Ague as Malaria," *J. Trop. Med. Hyg.* 74 (1976): 168-76.

years meant a miasmatic poison often connected with the marshes, rather than a specific disease.[50]

Creighton emphasized that the frequent references to agues or tertian fevers must not be interpreted as "malaria of the marshes" and he doubted that Cromwell's illness was of malarious origin. He pointed out that epidemics of various fevers, most probably influenza, raged all over England from 1657 to 1659.[51] However, he admitted that malarious areas existed in Cambridgeshire and Essex.

In the list of common diseases observed by Dr. Symcotts in his practice in and around Huntingdon "agues and fevers" are mentioned, although they were not given undue prominence in comparison with other outbreaks such as an epidemic of "red fever" among local children (probably scarlet fever).[52] Perhaps this was because ordinary agues were too common to merit special mention.

Sydenham describes the epidemics of "intermittent fever" in southeastern England in 1661-64; they were of two varieties, those of springtime and those of autumn; "Both begin with shiverings, heat breaks out next, sweats carry off the paroxysm." These outbreaks begin, according to Sydenham, mainly in February and in August; in 1661, when the summer was very hot, the tertian fevers, with some quartans, "were doing fearful mischief." "The spring intermittents were neither long nor dangerous, but an autumnal tertian . . . is never free from danger."[53] In the endemic areas of England, such as the estuary of the Thames, the marshes of southeast Kent and Essex, and

50. See John Macculloch, *Malaria: an essay on the production and propagation of this poison*.... (London: Longman, Rees, Orme, Brown, and Green, 1827). Also: S. Jarcho, "A Cartographic and Literary Study of the Word Malaria," *Journal of the History of Medicine and Allied Sciences* 25 (1970): 31-39; Paul F. Russell, *Man's Mastery of Malaria* (London: Oxford University Press, 1955); L.J. Bruce-Chwatt and J. de Zulueta, *The Rise and Fall of Malaria in Europe* (London: Oxford University Press, 1980).

51. Ch. Creighton, *A History of Epidemics in Britain*, 2 vols. (Cambridge: the University Press, 1891-94) 2: 303; see also L.J. Bruce-Chwatt, "John Macculloch, M.D., F.R.S. (1773-1835). (The Precursor of the Discipline of Malariology)," *Medical History* 21 (1977): 162-65.

52. Poynter and Bishop, op. cit. (note 8), p. 32.

53. K. Dewhurst, *Dr. Thomas Sydenham, His Life and Original Writings* (London: Wellcome Medical Historical Library, 1966).

the fen country covering large parts of Lincolnshire, Huntingdonshire, Cambridgeshire, and portions of Suffolk and Norfolk, malaria often broke out during long, warm, and humid seasons.

An anonymous poet of the seventeenth century wrote about the fens:

> The moory soil, the wat'ry atmosphere
> With damp unhealthy moisture chills the air.
> Thick, stinking fogs and noxious vapours fall,
> Agues and coughs are epidemicall;
> Hence every face presented to our view
> Looks of a pallid or a sallow hue.[54]

In the northern hemisphere in areas in which the summer isotherms are between 16° and 20° F. *Plasmodium vivax* of "benign tertian" malaria was the prevalent parasite; *P. malariae* was not uncommon but was distributed patchily. It is doubtful if *P. falciparum* was ever present except as an imported exotic infection. Certainly malaria, as we understand it today, was common in low-lying parts of southern and southeastern England before the time of Cromwell, during his lifetime, and, although greatly reduced, for about two centuries afterward. It is therefore very likely, though unconfirmed, that Oliver was exposed to malaria (mainly of *Plasmodium vivax* type) in the fens for at least 25 years of his life. If so, he would have acquired some immunity to it, perhaps not sufficient to prevent reinfection but adequate to protect him from severe or fatal symptoms.

Some historians, aware of the fact that marshy areas existed in and around seventeenth century London, believe that Cromwell's "tertian ague" was of local origin, acquired either at Hampton Court or even in the vicinity of Whitehall. Although this cannot be excluded, vivax malaria would not have assumed the pernicious character of Cromwell's illness. Malignant falciparum malaria transmitted by local *Anopheles* would be so improbable that it must be dismissed from consideration.

The severe epidemic of "country malaria" that broke out among Cromwell's soldiers in Ireland was certainly not malaria but probably either typhus or louse-borne relapsing fever. Buchan[55] describes it as

54. Quoted in Darby, op. cit. (note 16), p. 117; see also Mary Dobson, "Marsh Fever — the Geography of Malaria in England," *J. Hist. Geography* 6 (1980): 357-89.

55. Buchan, op. cit. (note 3), p. 349.

"spotted fever, that plague which turns bones into water." MacArthur points out that true malaria was very rare in Ireland and that "Irish ague" or "fiabhras criothach" (shivering fever) was the disease with a recurrent febrile pattern caused by spirochetes of the genus Borrelia, and transmitted in an epidemic form by lice during wars and other disasters, when large numbers of people live in close contact in insanitary conditions.[56]

Cromwell's severe illness, which occurred in Scotland about four months after his Irish campaign, is not likely to have been a recurrence of previous infection with Borrelia. One or two relapses of that disease may occur within a month but not much later. Perhaps this febrile episode was the sign of a urinary infection, aggravated by fatigue and cold and related to a chronic illness from which he temporarily recovered in Edinburgh but which eventually killed him seven years later.[57]

Symptoms of Cromwell's last illness, lasting for sixteen days and characterized by pains in the back and abdomen, "general distemper," intermittent fever combined with several "burning fits" (two in twenty-four hours!), do not correspond to the attack of "tertian ague." The adjective "bastard" given to it by Dr. Bate indicates the absence of true periodicity.[58] There is no doubt that irregular, intermittent fever with rigors, sweating, anaemia, and other symptoms suggestive of malaria can often be observed in septicaemias of biliary or urinary origin. French

56. MacArthur, op. cit. (note 21), p. 78; see also F. Prinzing, *Epidemics Resulting from Wars* (London: Oxford University Press, 1916), pp. 3-10.

57. This suggestion was first made by A. Dickson Wright, M.S., F.A.C.S., "Oliver Cromwell's Head," *St. Mary's Hosp. Gaz.* 43 (1937): 68. It was confirmed by Dr. Chalmers Davidson of Edinburgh, in A. Fraser's book, op. cit. (note 6), p. 672.

58. The term "bastard ague" or "bastard tertian fit" was used in the seventeenth century to describe febrile attacks that were irregular or not typical of true intermittent fevers. Thus Sydenham writes: ". . . the tertian comes every day and the quartan two days together the third being free and sometimes thrice in three days when it proves a treble quartan the disease being denominated from the type when it first invaded, which doubling proceeds sometimes from the excesse of the aguish matter, and the overactivity there of and in that case the bastard fit anticipates . . ." Thomas Sydenham, "Febres intermittentes," Locke MS c 29, ff. 25-28; see also Dewhurst, op. cit. (note 53), p. 131.

clinicians of the nineteenth century were impressed by the resemblance of these symptoms to malaria and designated them as "accès pseudo-palustre."[59]

Dr. Bate's brief and imprecise report on Cromwell's postmortem examination appears to confirm the absence of the splenic enlargement that would have been expected in malaria. On the contrary, the soft spleen, containing a semifluid mass ("lees of oil") suggests septicaemia, and the rapid decomposition of the body seems to support this inference.

There remains the question of Cromwell's treatment by his doctors. The statement by Fraser[60] that he was given various antimalarial remedies including the Peruvian bark, cannot be substantiated. There is also no evidence of the popular story that the Peruvian or Jesuit's bark was offered to Cromwell but that he refused it, because it was a "Popish remedy."

It is more likely that the events were as follows. Peruvian bark was brought to Spain by Juan de Vega about 1640. Although its fame spread rapidly, the price of the powder was so high (100 reales for a pound), that worthless astringent substitutes were very common. The bark became popular in Europe about 1649, when a sizable quantity reached Spain. In 1654 or 1655 it reached England. The first written mention of its use in England is by John Metford of Northampton in his *Observationes et Curationes.* In 1656 he cured a pregnant woman suffering from "quartan fever" by giving her small doses of the bark. But the drug was still controversial, and shortly before Cromwell's illness a London alderman named Underwood died while taking a large dose of it. This must have cast immediate suspicion on the poisonous properties of Peruvian bark and Cromwell's physicians may have feared to administer it to him. They might have preferred to carry on with bleeding, purging, and emetics, to remove the "poisonous ferments" from the body before administering emollients and cordials.

59. "Les accès de fièvre symptomatique de la pyohémie, ceux qui se produisent dans les cours des suppurations internes et dans la lithiase biliaire ou urinaire, sont identiques aux accès de fièvre intermittente et presentent les stades classiques de frisson, de chaleurs et de sueurs . . ." Alphonse Laveran, *Traité du paludisme* (Paris: Masson, 1907), pp. 422-26.

60. Fraser, op. cit. (note 6), p. 671.

That Peruvian bark was still a novelty in England at this time is corroborated by the advertisement which appeared in the *Mercurius Politicus* of 1 and 29 July, of 28 October, and 16 December, 1658 (note the dates!)[61]:

> These are to give notice, That the excellent Powder known by the name of Jesuit's powder which cureth all manner of Agues, Quotidian, Tertian and Quartan, brought over by James Tompson Merchant of Antwerp, is to be had at the Black-Spread-Eagle over against Black and white Courte in the Old Baily, or at the shop of Mr. John Crook, at the sign of the Ship in St. Paul's Churchyard, a Bookseller with directions for using of the same.

In the last issue of this announcement (16 December 1658) the following note was added: "Which Bark or Powder is attested to be perfectly true by Doctor Prudjean[62] and other eminent Doctors and Physitians who have made experience of it." Even Thomas Sydenham (1624-89), who recognized the value of *Cortex peruanus* or *Pulvis Comitissae* for treatment of intermittent fevers and recommended them in his *Methodus Curandi Febres* (1666), was more cautious in the second edition (1682) of his book. The remedy had gone out of favour, partly because of the many bogus preparations and partly because many illnesses of "intermittent constitution" were not malaria, hence no amount of Peruvian bark could have cured them. Under the name *Cortex peruanus* Peruvian bark was not included in the *Pharmacopoeia Londinensis* until 1677, and its popular name of "Jesuit's powder" could not fail to arouse suspicion at the time of intense anti-Catholic feelings.

It must also be remembered that as late as 1672 Richard Lower, physician to Charles II, refused to treat the king with this remedy. It was Robert Taylor, a semi-educated apprentice apothecary, who eventually persuaded the royal patient to take Peruvian bark for his true malarial ague. Only in 1676 did Sydenham acknowledge the value of the new remedy. Doubts about it and setbacks to its proper use continued until 1712, when Francesco Torti is said to have shown that it was a specific drug only for true "marsh agues or intermittents" but not for other febrile diseases.

61. J. Jaramillo-Arango, *The Conquest of Malaria* (London: Heinemann, 1950), p. 75. Also Russell, op. cit. (note 50), p. 102.

62. Dr. Prudjean was Sir Thomas Prujean (1629?-1662), President of the Royal College of Physicians of London from 1650 to 1653.

Even if Cromwell's doctors had decided that their patient might benefit from a large dose of powdered Peruvian bark, it is more than doubtful that this drug could have cured him. The most probable retrospective diagnosis of Cromwell's terminal illness, a diagnosis based on an unsatisfactory case history, pieced together from bits of medical notes, including an inadequate autopsy report and some non-medical writings, leans towards septicaemia, because of the irregular pyrexia, rigors, and lumbar pain followed by a semi-comatous state. The origin was probably pyonephrosis related to chronic nephrolithiasis, since renal colic had plagued Oliver Cromwell during most of his adult life.

Wellcome Museum of Medical Science
PO Box 129, The Wellcome Building
183 Euston Road, London NW1 2BP
England

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The Evaluation of Impotence by Sexual Congress and Alternatives Thereto in Divorce Proceedings*

THOMAS G. BENEDEK and JANET KUBINEC

SEXUAL impotence has been a legal basis for annulment or divorce since early in the Christian era. If impotence was to be a legal criterion, it required definition and means of proof. In this study we have sought to trace the evolution of the definition of this dysfunction, the principal methods of verification that were employed from the sixth to the nineteenth centuries, and the relative power of spouses to become divorced on such evidence.

The first detailed divorce statute was enacted in 448 A.D. under the Emperor Theodosius II (401-450). It contained fourteen grounds for which a woman could obtain a contested divorce, and the same number for a man. All but two of these were analogous or identical[1] and they fell into two categories: first, conviction for various crimes, and marital problems — particularly adultery and assault on the spouse. No sexual dysfunctions were cited. The Code of Emperor Justinian (527-565), which was promulgated in 528 A.D., incorporated in its divorce statute the entire Theodosian law, which included divorce by mutual consent.[2] Three grounds which a husband might use in a contested divorce were added: if the wife had obtained an abortion, and two variations of the well-established reason of adultery. Wives received one new cause:

1. According to the Code of Theodosius II (448 A.D.), a woman could obtain a divorce if she could prove any of 14 separate, but partly related complaints: Her husband was 1) an adulterer, 2) a murderer, 3) a manufacturer of poisons, 4) a traitor, 5) a defrauder, 6) a desecrator of graves, 7) a temple robber, 8) a street robber, 9) a shelterer of robbers, 10) a livestock thief, 11) a kidnapper; or he had 12) consorted with prostitutes in the presence of his wife, 13) had threatened her life with poison, or a dagger, etc., 14) had beaten her. A man could obtain a divorce if he could prove the same or analogous grounds. Only numbers eight and ten were absent, but were replaced by two others: 1) if she spent the night away from home against her husband's wishes and without a valid reason, 2) if she visited the theater, circus, or other public places against his wishes. K. Wachter, *Über Ehescheidung bei den Römern* (Stuttgart: J.B. Metzler, 1822) 217-233.

2. J.A.C. Thomas, *The Institutes of Justinian* (Amsterdam: North-Holland Publishing Co., 1975) 34.

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> When a man remains impotent for two years from the beginning of the marriage the wife or her parents may send him a bill of divorce without having to fear the loss of the dowry. The husband, however, shall also retain his prenuptual gift.

For unknown reasons, an amendment in 536 A.D. lengthened the minimum period of impotent cohabitation to three years, and this *triennium* remained the critical interval in many divorce statutes for well over a millenium.[1, 3]

Female sterility and female "impotence" were not differentiated, nor was either cited explicitly as a ground for divorce. Females were considered fertile between the ages of twelve and fifty. On the basis of the ancient common law, which was not specifically repealed in Justinian's Code, it remained permissible to base a divorce action on the presence of a physically diagnosable defect to which infertility could be attributed.[1] The determination of virginity as proof of nonconsummation, which became so important later, was not of concern in this regard. However, it was a significant issue in another legal setting: the valuation of the price of a slave.[4] Midwives were charged with the examination of women.

Male impotence was classified under the general term *spado*, subdivisions of which had various legal ramifications. It could be normally related to age, the period of potency being defined as between fifteen and sixty. Impotence could be due to structural abnormalities or to diseases. Eunuchs were distinguished from unilateral and bilateral castrates. It is unclear which extragenital abnormalities were accepted as causes of impotence. Divorce based on an unidentifiable physical defect, or "general weakness," while possible, seems to have been rare. Presumably the same time interval after marriage pertained for the man as that which permitted a woman to seek a divorce from an impotent husband.

As Europe lapsed into the Dark Ages, the possibility that a woman could win a contested divorce diminished greatly. According to the

3. a) The section pertaining to the *triennium* is reproduced in Latin in München, "Über Unvermögen (impotentia) als Ehehinderniss," *Ztschr. f. Philos. u. kathol. Theol.* NF 1 (1840): 67-104, p. 74 note.

b) For the Greek version of this edict see K. Sudhoff, "Ein Regulativ zur gerichtsärztlichen Begutachtung männlicher Impotenz bei Ehescheidungsklagen aus der Mitte des 15. Jahrhunderts," *Arch. Gesch. Med.* 8 (1914): 89-97.

4. J.B. Friedreich, "Materien zur Geschichte der gerichtlichen Anthropologie aus den alten römischen Gesetzbüchern," *Bl. gerichtl. Anthrop.* 13 (1862): 188-218.

statute of the Synod of Compiègne (Compendiense) of 757 A.D., if both spouses attested that consummation had not occurred, only the oaths of seven of their relatives who vouched for their veracity were required. If, however, the man claimed that the marriage had been consummated his wife could not offer contradictory testimony and the marriage persisted.[5,6]

Another practice which, like the foregoing, was based on Teutonic rather than Roman law, was the trial by crucifix. This was a variety of trial by ordeal, whereby it was believed the decision would be rendered by God and therefore would be incontrovertibly just. Both spouses had to stand before a cross with their arms abducted, in the position of crucifixion. The one who held this position the longer was judged to have told the truth. Only in the unlikely event that the woman had greater strength did the result free her to remarry. This procedure was approved by the Synod of Verberie (Vermeriense) of 768, and also in a statute of Salzburg (Salisburgensia) of 799. How frequently such trials were held is unknown. They remained permissible until 1215, when trials by physical ordeal were outlawed by the fourth Lateran Council, which had been convened by Pope Innocent III.[6]

In the ninth century Bishop Hincmar of Rheims (d. 882) introduced the concept of a third major category of causes of impotence in addition to structural abnormalities (which included normal age-related changes) and diseases, namely, bewitchment. The principal evidence that impotence was due to magical intervention was inability to engage in intercourse with one partner, but potency with another. This diagnosis usually was limited to men. The same rules applied as with impotence that was attributed to other causes: if the spouse knew about the impotence prior to the marriage it could not be used to justify annulment, even though persons who knew themselves to be incapable of coition were forbidden to marry. Impotence also was not a valid ground if it began after consummation. It was considered "temporary" and non-actionable for as long as impotence due to other causes, usually three years, whereupon it was reclassified as "perpetual" and became a

5. J. Freisen, *Geschichte des canonischen Eherechts bis zum Verfall der Glossenlitteratur* (Tübingen: F. Fues, 1888) 334.

6. J. Löffler, "Die Störungen des geschlechtlichen Vermögens in der Literatur der autoritativen Theologie des Mittelalters," *Abahndl. d. Geistes- u. Sozial-Wissenschaftlichen Klasse* (Mainz: Akad. d. Wiss. u. d. Lit.) 6 (1958): 297-379, p. 337.

ground for divorce.[7,8] Since most men presumably would have wished to avoid accusations of fornication or adultery, this argument must usually have pertained to widowers. Despite some tracts wherein the occurrence of selective impotence — and, therefore, magical intervention — was denied, the concept became widely accepted. Its invocation reached its peak during the witchcraft persecutions in the sixteenth century,[9] but it was employed as recently as the eighteenth century.[10]

Although impotence from the inception of marriage remained a primary justification for annulment, the precondition of three years of impotent cohabitation was not adhered to consistently during the Dark Ages. The most significant attempt to regularize the practice of the ecclesiastical courts in this regard was made by Bishop Burchard of Worms (Rhineland) (ca. 965-1025 A.D.) in about 1010. At least in theory, his rulings should have returned the divorce process toward the greater equality between partners that had existed in Roman law, as well as authorizing judicial flexibility in the evidentiary consideration of the

7. Ibid., pp. 301-302, 358.

8. J. Freisen, op. cit. (note 5), pp. 353-355.

9. *The Malleus Maleficarum* (Hammer of Witches), 1484, which became the principal guide to the witchcraft persecutions of the next two centuries, contains a section (Part I, question 8) entitled "Whether witches can hebetate the powers of generation or obstruct the venereal act." According to this, men are more susceptible to being bewitched into impotence than are women for two main reasons: men are more vulnerable for anatomical reasons; and, since most witches are women, they have a greater interest in attacking men. In regard to the differentiation of natural and magically induced impotence, the *Summa* of Hostiensis (Henry of Segusio, ca. 1200-1271), completed in 1253, is cited: "When the member is in no way stirred, and can never perform the act of coition, this is a sign of frigidity of nature; but when it is stirred and becomes erect, but yet cannot perform, it is a sign of witchcraft." H. Kramer and J. Sprenger, *The Malleus Maleficarum,* trans. by M. Summers (1928; repr., New York: Dover, 1971) 54-57.

10. In 1681 a man sought the expertise of the medical faculty of the University of Leipzig to defend himself against the accusation of impotence, for which his wife, after 12 years of marriage, sought a divorce. He alleged "... that this condition was brought upon me by evil people, but may be cured." The faculty, however, concurred only with the former premise: "This impotence presumably results from an incantation. It will, however, scarcely be treatable because it has already lasted twelve years and both erections and desire for coitus are being lost more and more." J.F. Zittmann, *Medicina forensis* . . . (Franckfurt am Mayn, 1706) 675-676.

duration of impotence. In the first passage to be cited, Burchard addresses a man whose wife has initiated the divorce action, while in the second the husband had been the initiator.

> . . . But if she first appeals to the Bishop or to his emissary after a year or six months and declares that you have not known her and says that there has been no sexual intercourse between you, [and] you, on the other hand, maintain that she is your wife, [saying that] you must be believed because you are the woman's guide and ask why she was silent for so long if she wished to appeal in this way. You say that a woman could have known quickly in a short time whether you are able to have intercourse with her. But if, on the other hand, she would in this unusual circumstance have declared herself to the Bishop or to his emissary after a month or two at the most, saying "I wish to be a mother, I wish to have sons and I took a husband for this reason. But because the man I married is impotent he cannot do the things for which I took him." If this can be proved by proper judicial investigations you can be separated and she, if she wishes, may marry in the Lord.

Burchard here reversed the intent of the statute of Compiègne, which prohibited a woman from contradicting her husband's allegation that he is potent, and also decided that a few weeks of non-consummation is a sufficient reason for annulment *if this can be proved.* He then addressed a less likely circumstance:

> You have taken a woman and you have kept her for some time — a month, or three months, or even a year, and then you first say that you are impotent, wherefore you could not have intercourse with her or with any other woman. And if she, who has been your lawful wife, affirms that which you say, and if it can be proved by proper judicial investigation that it is as you have said, you can be separated, but with the reservation that if afterwards you take another woman you will be judged guilty of perjury and, after doing penance, you must again resume your former married state.[11]

Here Burchard was saying that, first, the wife does not have to be the party who initiates the annulment proceeding based on impotence; however, second, if the husband wishes to admit to impotence he does not have a longer time to do so than if he were accused thereof by his wife. Implicitly, he may not allege his own impotence after prolonged marriage as a subterfuge to obtain an annulment. Burchard clearly did not believe in selective impotence. Whether the penalty of having to return to his first wife if he dared to marry another was contingent on

11. J. Löffler, op. cit. (note 6), pp. 337-338.

her marital state at that time is unclear (*vide infra* in regard to more recent similar English legal opinion). Most important for our discussion, Burchard insisted on judicial verification of impotence, but did not call upon medical consultants to assist in this determination.

If an unconsummated marriage were necessarily irrevocable, then disputes about varieties of impotence and how they could be ascertained would have been irrelevant. However, the question whether sexual intercourse must take place before a marriage exists in fact became a major theologic issue in the twelfth century. The Parisian school, exemplified by Petrus Lombardus (d.1160), held that the intent of consummation contained in the marital sacrament sufficed to make a marriage indissoluble.[12-14] The Bolognese school, exemplified by Gratian (mid-twelfth C.) argued that physical consummation is required to seal the bond of marriage. However, even Gratian did not explicitly advance the corollary that lack of consummation must result in annulment. Continued life together as quasi-siblings was deemed preferable.[15-16]

The popes who succeeded Alexander III (reigned 1159-1181) sided with Lombardus and refined his reasoning.[17] Thus, the interest in sexual physiology which developed concurrently may be considered a pragmatic trend which was contrary to the philosophic orientation of the ecclesiastical hierarchy.

Gratian's collection of church laws and his interpretations of them became the basis of many commentaries. Simon de Bisiniano wrote one of these in the mid-1170's and seems to have been the first Christian theologian to recommend physical examination as part of the adjudication of allegations of impotence.[18] A decade later Huguccio, Bishop of

12. J. Freisen, op. cit. (note 5) pp. 350-351.

13. I. Fahrner, *Geschichte des Unauflöslichkeitsprinzips und der vollkommenen Scheidung der Ehe im kanonischen Recht* (Freiburg im Breisgau: Herder, 1903) 179-182.

14. J. Löffler, op. cit. (note 6), pp. 361-362.

15. W. Plöchl, *Das Eherecht des Magisters Gratianus* (Wien: F. Deuticke, 1935) 66-71.

16. I. Fahrner, op. cit (note 13) pp. 171-178.

17. D.S. Bailey, *Sexual Relation in Christian Thought* (New York: Harper, 1959) 128-140

18. J. Löffler, op. cit. (note 6), p. 370.

Ferrara (d. 1210), endorsed this idea, as did various writers soon afterward. An important stimulus for the approval of physical examination undoubtedly was a decree by Alexander III in 1176 whereby he invalidated the use of oaths as the principal substantiation of impotence in divorce litigation.[19] Since the use of trial by ordeal was waning, this, in effect, mandated that medical evidence should become paramount in guiding decisions which involved the consideration of impotence. Here there was a merging of reascendant Roman law, which emphasized expert testimony, and Germanic law, which leaned on the use of the seven oaths. Even though neither the conduct of the examinations nor the findings to be sought were specified, forensic medicine in relation to sexual dysfunctions may be said to have begun at the end of the twelfth century. Adjudication was required even if both spouses agreed that perpetual impotence existed; the courts were wary of possible collusion by spouses.

Cases that pertained to impotence put the courts into a position of conflict because, despite the charge to mankind to "Be fruitful and multiply" (Genesis 1:28), since the time of St. Augustine (354-430) and even earlier, sexual intercourse had been deemed to be at least tainted with sin.[20] Hence marriage without coitus was not only permitted but praised. Thomas Aquinas (1225-1275) reasoned like St. Augustine that

> Matrimony is holier without carnal intercourse . . . Therefore, carnal intercourse is not necessary for the sacrament of marriage.[21]

19. Ibid., pp. 342-343.

20. Scripturally, the ambivalence or even overt hostility of theologians toward marital sexuality was based on the admonition of St. Paul (I Corinthians 7:1-9), especially (2) "To avoid fornication let every man have his own wife and let every woman have her own husband," and (6) "But I speak this (of sexual activity) by permission, and not of commandment."

St. Augustine wrote in the Letter to Ecdicia:

> . . . he had not ceased to be your husband because you had both agreed to abstain from carnal intercourse; instead of that, the tie that bound you to each other as husband and wife remained all the more holy because of the greater holiness of the resolutions you were with one accord carrying out.

St. Augustine, *Select Letters,* trans. by J.H. Baxter (London: W. Heinemann, 1930) Letter #60, pp. 500-521; see p. 505.

21. *The "Summa Theologica" of St. Thomas Aquinas,* trans. by fathers of the English Dominican province (London: Burns Oates & Washbourne, 1932) 19:94, Q. 42, art. 4.

And later, also in the *Summa Theologica*:

> Now even for married people it is better to be continent than to make use of marriage. Therefore unless she ask expressly for the debt, the husband should presume that it pleases her to be continent, and so he is not bound to pay her the debt.[22]

The onset of impotence after consummation was discussed only in regard to proper adaptation of the spouse and never as a basis for divorce. According to Aquinas:

> If the husband be rendered incapable of paying the debt through a cause consequent upon marriage, for instance through having already paid the debt and being unable to pay, the wife has no right to ask again, and in doing so she behaves as a harlot rather than as a wife. But if he be rendered incapable through . . . an unlawful cause, then he sins, and his wife's sin, should she fall into fornication on this account, is somewhat imputable to him . . .[23]

Despite attempts at liberalization such as that of Burchard, the triennium remained the criterion in most jurisdictions.[24] In about 1212 Bishop Tancred of Bologna (ca. 1185-1235) made a ruling which complicated the interpretation of this interval. In his judgment, for the triennium to serve as a basis for annulment not only must the time have passed and the litigants and their seven character witnesses sworn that sexual intercourse had never been completed, but also that coitus had been attempted repeatedly. This refinement gained in importance when it was adopted in the Decretals of Pope Gregory IX.[25]

Even though by the end of the twelfth century midwives and physicians began to be employed to perform forensic genital examinations, the few advances in knowledge about sexual function that were made must be credited to clerics who are not also known to have been physicians. Thus, Walter of Mortagne (d. 1174) probably was the author of a tract on marriage in which, for the first time, female genital

22. Ibid., 19:314, Q. 64, art. 2.

23. Ibid., 19:313-314, Q. 64, art. 1.

24. W. Plöchl, op. cit (note 15). Gratian was the most notable among the minority who did not advocate the triennium as a criterion for annulment.

25. J. Löffler, op. cit. (note 6), p. 354.

anomalies were considered to be possible causes of "impotence."[26] Alexander III, a few years later, became the first pope to acknowledge *arctatio* (anatomical impediments to intromission) as a basis for annulment.[27]

The medieval popes drew from the bishops to themselves the responsibility for establishing laws and procedures to govern annulment. The uniformity with which these decrees were disseminated or adhered to by the various ecclesiastical courts is uncertain. Furthermore, the decrees usually constituted individual case law, and those of successive popes reflected their varying attitudes rather than consistent trends. One of the most interesting decrees was issued by Pope Innocent III (reigned 1198-1216) in 1206. Perhaps in amplification of the decree of Alexander III, cited above, he ruled that when a woman is incapable of coition because of a circumstance which, although theoretically remediable, can only be corrected by "a divine miracle, or by human intervention which would endanger her life," an annulment may be granted. He endorsed the necessity of physical examinations to prove impotence, but also acknowledged the difficulty of ascertaining that "impotence" in man or woman is permanent.[28] In 1234 Pope Gregory IX (reigned 1227-1241) published a great collection of selected papal decrees which thereafter formed the basis of ecclesiastical law for centuries. In regard to divorce he accepted for his Decretal only decrees which permitted proven impotence to be a justification.[29] This stabilized the orientation of subsequent relevant decrees but did not address the problem of proof.

About a century later the question of what needed to be proved became complicated by another French theologian, Petrus de Palude (or Paludanus, ca. 1280-1342), who distinguished between merely erectile potency and the ability to ejaculate. He wished to redefine consummation of marriage to require not only intromission which, of course, implied a presumption of ejaculation, but to specify the occurrence of intravaginal ejaculation.[30] We must therefore discuss the problem of evidence which this concept entailed.

26. Ibid., p. 307.

27. Ibid., p. 311.

28. Ibid., pp. 312-313.

29. Ibid., pp. 345, 363-364.

30. Ibid., 320-321.

Congress

Many medieval authorities probably realized that a functional evaluation of potency would be more reliable than mere anatomical inspection, but also that such a procedure would introduce additional practical and ethical difficulties. A possible method was suggested in classical literature, namely, in a tale by Lucian of Samosata (2nd century A.D.) entitled "The Eunuch," or "The Philosopher without Gender." In it two men were discussing the qualifications of a candidate for court philosopher whose masculinity was in doubt:

> Opinions differed. Some advocated that he should undress, as is customary when one wishes to purchase a slave, so that one may convince oneself that he is sufficiently equipped with the requisites to become a philosopher; others were of the opinion that one should fetch several women from the B . . . in order to discover by means of the congress in the presence of the oldest and most honorable among the judges whether he is a philosopher. Since, however, the laughter became overwhelming . . . it was concluded to have the entire matter decided in Italy.[31]

Lucian set the story in Greece in the fourth century B.C. Even if it were entirely a political satire and without historical foundation, he proposed two alternatives; virility could be evaluated by an inspection of the genitalia, or demonstrated with a prostitute.[32]

The procedure that was rejected in Lucian's tale came to be called congress and may be defined as the judicially mandated, officially witnessed attempt at sexual intercourse.[33] Whether it actually was

31. Lucian Samosatensis, *Sämtliche Werke,* tran. by C.M. Wieland (Darmstadt: Wissenschaftliche Buchgesellschaft, 1971) 3: 189-200, "The Eunuch, or, The Philosopher without Gender," p. 199.

32. Lucian's tale was cited by several of the French authors on congress: e.g., A. Hotman (p. 27 o); V. Tagereau (pp. 151-152); C. Guillemeau (p.28); F.G. de Pitaval (p. 228). *Vide infra.*

33. The first literary English use of the word "congress" to mean a sexual union has been attributed to Richard Puttenham (or his brother, George), one of whom was the author of *The Arte of English Poesie* (London: R. Field, 1589; repr., Menston, England: Scolar Press, 1968). In Book II, p. 88, writing about symbolic devices, he described ". . . two strange serpents entertangled in their amorous congresse, the lesser creeping with his head in the greaters mouth . . ."

The Encyclopaedia Britannica (Edinburgh: A. Bell & C. MacFarquhar, 1771) 2: 265 defined *congress*: "in a judicial sense, the trial made by appointment of a judge, before surgeons and matrons, in order to prove whether or no a man be impotent, before sentence is passed for the dissolution of a marriage, solicited upon such a complaint."

utilized in ancient Greece or was a medieval innovation remains obscure. The earliest medieval reference to congress dates from the second half of the thirteenth century, thus antedating Paludanus. It appears in Section XIII of the commentary on the Decretals of Gregory IX composed in Bologna by Abbas Antiquus (d. 1288), a French Benedictine. He advised that congress be ordered in a divorce proceeding instead of requiring the couple to remain together for three years of impotent cohabitation if any of three circumstances pertained: the woman admittedly was not virginal at the time of the wedding; she was considered not to have complained of her husband's impotence quickly enough; or the allegation of impotence could not be ascertained by physical examination. Several theologians in the next century argued similarly to support the use of congress. The most distinguished among these was Giovanni d'Andrea, professor of canon law at Bologna (d. 1348).[25] The earliest description of congress appears in the *Chirurgia Magna* of the papal physician Guy de Chauliac (d. 1368), which was completed in 1363. He wrote:

> The physician, with the permission of the judges, examines primarily the constitution and composition of the genital parts. After that, the judges may rule that the couple lie together for several days in the presence of a midwife who is accustomed to these things. The midwife will give the couple spices and wines, warm them and anoint them with warm oils, rubbing them beside a fire of vine branches,[34] and she will tell them to talk, caress and kiss. Then this midwife will report to the physician what she has seen. And when the physician has been informed he can introduce the truth in the court. But the physician should be careful that he is not in error, because there have been deceptions in such things. And there is the great danger of separating the couple whom God has joined together; otherwise the pursuit of justice demands it.[35]

The lack of privacy that was typical of medieval housing may have made this test seem less voyeuristic and, hence, morally more acceptable at that time than it later was deemed to be. But, even so, if this passage may be taken literally, the authorization of a woman, albeit a midwife, to anoint the male genitalia is surprising. Women, even when they were authorized experts, were not permitted to testify personally.

34. R.P. Brittain has speculated that vine branches were specified as fuel because the vine was an ancient fertility symbol in his "The 'proof of congress' in alleged impotence," *Med. Legal J.* 32 (1964): 125-127.

35. Guy de Chauliac, *La Grande Chirurgie* (1363), trans. by E. Nicaise (Paris: Germer, Bailliere et Cie, 1890), Doct. II, chap. 7, p. 546.

When the employment of congress faded out, if indeed it did, or how widespread and prevalent it had ever been, is unknown. We are unaware of any specific papal prohibition of the procedure. At most, its abandonment could not have lasted much beyond the fifteenth century. According to the French legal scholar, François Gayot de Pitaval (1673-1743), "... congress was practiced in foreign countries,"[36] but he does not suggest that it had occurred recently except in France. Other authors have stated without documentation that its resumption was limited to France. It is likely that this occurred early in the sixteenth century. According to Antoine Hotman (1525-1596), a Parisian attorney who in 1581 wrote on divorce:

> . . . I do not know by what misfortune of our century one of the most brutal practices that one could imagine was introduced . . . it has little reason or semblance to justice: this is what they call congress. In addition, it is contrary to public decency; moreover, it is unquestionably useless . . .[37]

Whether the repeatedly cited circumstances of the resumption of congress are anecdotal or factual is uncertain. No details of time or place were ever cited. Allegedly, a man who was being sued for divorce based on the charge of impotence petitioned the court to permit him to prove his potency by ordering the couple to have sexual intercourse before judicially appointed witnesses. This was granted, and his successful defense resulted in the acceptance of congress by the French ecclesiastical courts as a forensic technic.[38, 39]

The use of congress soon came under attack, first on grounds of public morality and private psychology. To these was added the realization that for coitus to succeed the woman must cooperate and

36. F.G. de Pitaval, *Causes célèbres et intéressantes avec les jugemens qui les ont decidées* (La Haye: J. Neaulme, 1737) 8: 218.

37. A. Hotman, *Traicté de la dissolution du mariage par l'impuissance & froideur de l'homme ou de la femme* (Paris: M. Patisson, 1581) 26 o, r.

38. V. Tagereau, *Discours sur l'impuissance de l'homme et de la femme* (Paris: J. du Brayeten & N. Rovsset, 1612) 159-160.

39. L. Formey, "IV. Über den Werth medizinisch-gerichtlicher Untersuchungen, das männliche Unvermögen betreffend," in *Medizinische Miszellen aus dem Nachlasse des T.G.A. Roose* (Frankfurt a.M.: F. Willmans, 1804) 92-102.

that, hence, she may determine the outcome of the congress even if her spouse has adequate erectile potency. The earliest notable opponent of congress was the surgeon, Ambroise Paré (1510-1590). He wrote in 1573:

> Often divorce proceedings are begun because the wife asserts that her husband is impotent, and not performing his husbandly duties. The husband says that it is not his fault, that his wife is . . . so tight that he is unable to enter her and that failure is not due to his impotence.
>
> In such cases the judges order the examination of both parties by doctors, surgeons, midwives and priests of the officialdom . . . the report will be given to the judges for their information. The judges can then order the married couple to sleep together in the presence of said doctors and others named above, in order to determine whether the couple can accomplish "the game of Venus." It seems to me that such proof is not well founded and that the said "game" cannot be performed in the presence of others, as one might believe, especially with a woman whom one no longer loves. Furthermore, such action depends neither on our psyche nor on our body, nor on our free will, especially since the parts intended for such acts do not respond at our will, as do our limbs, but spontaneously. This is a statement to which any man may swear if he were to confess that he cannot make his potency appear so as to be capable of the marriage act in the presence of so many people and, as I have said, with a woman whom one no longer loves . . . Such actions require confidence and secrecy and a friendship between a man and a woman.[40]

The best of the few detailed descriptions of the conduct of congress is contained in a lengthy diatribe against this practice published in 1612 by Vincent Tagereau, a Paris attorney.

> The examination of the woman, being dishonorable and odious, should be avoided, and is performed only after the man has been examined, when any other proof is lacking and the couple has lived together for three years. They cannot be separated before that time . . . Proof of the virginity of a woman by examination is doubtful and uncertain . . ., depending on the judgement of the one who examines her . . .[41]

After the judge had ordered the congress to take place, the litigants were sworn to try their best to complete intercourse, and the experts were sworn to report accurately. How the site of the congress was

40. A. Paré, *Les oeuvres d'Ambrose Paré . . . divisees en vingt neuf livres* (1573; repr., Paris, 1598) 1188: Rapport de l'impuissance tant de l'homme que de la femme.

41. V. Tagereau., op.cit. (note 38), pp. 66-68.

selected is not clear, but usually it was not the litigants' home. Preliminarily the man's genitalia were washed in tepid water and the woman bathed in a tub. The legal reason for bathing was to remove any surreptitiously applied medications, such as alleged anti-aphrodisiacs, from the penis, and astringents which might constrict the vagina. Whether the actual effect of this was relaxing or stimulatory probably varied with the subjects. Following the ablutions the couple, during the daylight, went into the bed about which they were permitted to draw a curtain. Midwives would remain in the bedroom, but if the litigants requested it, the male experts, leaving the door open, would withdraw. After an hour or two, unless called back sooner, the witnesses would open the bedcurtain and ask what had transpired. The woman might allege that her husband had entered her digitally, or the man that his wife had prevented intromission. Such verbal disputes were commonly overheard while the curtains were drawn. Tagereau commented that "The woman could prevent him unless one would hold her hands and her knees, which is not done." Then the litigants were to be examined and evidence both of intromission and of ejaculation was to be sought

> . . . not without candle and glasses, because it is done by persons of advanced age . . . Then they write the official report of the congress, or rather what they pretend has happened, which they will transmit to the judge who is waiting in another room with the prosecutors and patricians . . .[41]

Some writers complainingly attributed an increase in the number of divorces to the resumption of congress,[42,43] but none gave an estimate of the frequency with which it was ordered. In view of the preconditions for initiating a divorce suit, and if the fifteenth century English data gathered by Helmholz[44] were at all applicable, divorce actions must have been rarities, even if they did increase somewhat.

42. J. Devaux, *L'art de faire les raports en chirurgie* (Paris: L. d'Houry, 1703) 496.

43. N. Venette, *The Mysteries of Conjugal Love Reveal'd*, anonymous translation (1712; repr., London: C. Carrington, 1906) 482. The first French edition was published in 1696.

44. R.H. Helmholz, *Marriage Litigation in Medieval England* (Cambridge: Cambridge Univ. Press, 1974) 74-75.

Beyond general criticisms, litigating wives, midwives, and judges were castigated for their respective roles in congress. According to Paré:

> Man's potency depends more on the conscience of the woman than on the probation of congress . . .[40]

And a few years later Hotman wrote:

> One would think that so dishonest a congress could moderate the complaint of the women: but to the contrary . . . they are fortified by this method, and from the commencement of their divorce process the women themselves ask for the congress, all knowing that this is an indubitable means by which to win their case . . .[45]

Following the abolition of congress in 1677 such attacks continued, and sometimes were still phrased in the present tense. Thus, Nicholas Venette (1632-1698) remarked:

> 'Tis only a pretext for divorce, and an effect of the lasciviousness and audaciousness of women. 'Tis they who have put the Judges upon a proof as uncertain as 'tis immodest.[46]

As an example of women's audacity and judges' impropriety Jean Devaux (1649-1729) cited the example of a seventy-five year old man whose wife accused him of impotence and commented that "He was submitted to this infamous experience, contrary to honesty and in spite of his age."[47]

Those who chastised women for preventing their spouse from demonstrating his potency in congress implied that he must have wished to maintain marriage since, if congress were successful, the marriage would be consummated officially and virtually indissoluble. Charles Guillemeau (1588-1656) presented a more plausible interpretation. In his view one of the features that made the procedure undesirable was that it afforded an opportunity for collusion by the partners, each of whom was seeking freedom from the other.[48]

45. A. Hotman, op. cit. (note 37), p. 28 o.

46. N. Venette, op. cit (note 43), p. 481.

47. J. Devaux, op. cit. (note 42), p. 488.

48. C. Guillemeau, *Traicté des abus qui se commettent sur les procedures de l'impuissance des hommes et des femmes* (Paris: A. Pacard, 1620) 35.

The competence of midwives to play an important role in a legal process such as congress also was called into question. During the Middle Ages midwives were illiterate lower-class women who had gained some rudimentary knowledge of delivery and childbed care, usually within their own families. Their social status did not improve very much as their professional status became more clearly established. Professionalization resulted from licensure by their municipality and an examination soon became required for this purpose. The licensure of midwives began in Bavaria in the latter half of the fifteenth century. The first French midwifery statute was enacted in 1560 for the jurisdiction of Paris.[49,50] Most relevant to our topic is the following passage in the Paris ordinance:

> The matrons or expert midwives shall not make a report by themselves on the chastity, corruption or pregnancy of girls or women without the presence of a physician, two official surgeons of the King . . ., or one of them . . . since they [midwives] are not instructed in this matter, added to which is the need to write and sign those reports, and few of them know how to write.[49]

Hotman, in writing about congress, revealed a rather romantic faith in the superiority of ancient midwives and also gave an indication of the recent decline of their authority relative to that of physicians and surgeons:

> In extreme cases the wife is made to be examined to prove her virginity. In ancient times only midwives were allowed to make such an examination. Today physicians and surgeons are permitted to do this because midwives are not instructed in anatomy as they were in ancient times . . . And the natural modesty of women was also the reason to instruct certain women in these things.[51]

Guillemeau also criticized the midwives who participated in congresses as official observers. He complained of their illiteracy and their ignorance of anatomy. In addition he made the following observation:

49. T.G. Benedek, "The changing relationship between midwives and physicians during the Renaissance," *Bull. Hist. Med.* 51 (1977): 550-564.

50. R.L. Petrelli, "The regulation of French midwifery during the *Ancien Regime*," *J. Hist. Med.* 26 (1971): 276-292.

51. A. Hotman, op. cit. (note 37), p. 24 o.

> The visitation is decided only or principally by the reports of women called midwives. Although doctors and surgeons are summoned with the midwives, sometimes the opinions vary, and the judge and the people, for I don't know what reason, are inclined to accept the report of the said women.[52]

A further reason for the unreliability of congress besides the psychophysiological handicap of the male litigant and the incompetence of the witnesses was, according to Devaux, incompetence of the judiciary:

> Congress was introduced into the legal process by the ignorance of judges who were not sufficiently instructed in the subject they were to adjudicate . . . It was impossible to comprehend how many people were abused by this fatal proof of the husband's impotence . . .[53]

The published attacks on congress were redundant and far exceeded the defenses in both number and length. However, even opponents longed to find redeeming attributes. Thus, Tagereau stated:

> Congress, which is prescribed in these suits for annulment, ought more than anything else to help one to know whether men are potent or not. It should even correct mistakes, whether made by error or malice, in examinations of women who are reported to be virgins when they are not. But congress cannot work, since the way it is used only oppresses the truth and makes all men appear impotent . . .[54]

The strongest defense of the practice was written by Pitaval some two generations after congress had been abolished. Whether he did so out of conviction or only to present both sides of a legal dispute is uncertain. He noted:

> It is true that among all the authors who spoke of congress almost all of them condemned it. . . It is strange that in a country so polite as ours, where we worship the God of purity, Justice authorized a shameful practice which violates the laws of modesty.[55]

52. C. Guillemeau, op. cit. (note 48), pp. 10-11.

53. J. Devaux, op. cit. (note 42), p. 487.

54. V. Tagereau, op. cit. (note 38), p. 146.

55. F.G. de Pitaval, op. cit. (note 36), p. 183.

However, Pitaval then argued as follows in behalf of the utility of the procedure:

> . . . congress is not more shameful than examination and allows us to judge the person's "condition." It has its drawbacks, but they are less than those of the other methods. For this reason congress is authorized by decree . . .[56]
>
> Some people argue that congress is a proof that is offensive to modesty . . . Do they want to spare the experts and midwives from facing it? Don't all men with good minds see this proof as everything that happens in a marriage, where imagination always represents more than does the sight itself? If, on the other hand, one wants to preserve the modesty of a husband and wife, and they are never examined, honesty is even more seriously compromised. What causes embarrassment is not so much the act itself, but decency, which does not allow it to be done publicly. Decency no longer is a factor when the court orders congress, and it even is beneficial for a man's honor to make his potency appear. Why imagine modesty as a virtue when it is only a weakness? . . .
>
> If proof were abolished, what would happen to the man falsely accused of impotence, or the girl abused in the name of marriage? One could question the couple for ever, take depositions from witnesses, make examinations — all of which are not sufficient to decide the condition of the two people. One ought not to entrust justice to a perhaps rash statement, or to misleading appearances. Without the help of congress it is impossible to judge the inner defect of potency and to know the true signs of virginity, which our eyes cannot see. It is therefore necessary to follow the laws of our fathers, who were no less enlightened nor less honest than we are. Experience taught them that one cannot judge the potency of a man by the action itself . . . Otherwise these things would be judged by exterior appearance. A type of proof ought not to be judged dangerous when it is the only means that can be used to discover the truth . . . In moral matters we are the masters of our will . . . but physical matters do not depend on our wills at all. When we interrogate nature we can get results.[57]

Despite its unusual aspects, the case of René de Cordovan, Marquis de Langey, which eventually led to the abolition of congress,[58] gives further insight into the legal procedure. In 1653 the twenty-five year old Marquis married Marie de Saint Simon, who was fourteen years of age.

56. Ibid., p. 218.

57. Ibid., pp. 220-223.

58. It has also been suggested that Tagereau's criticism of congress was the actual impetus to its abolition. J.G. Smith, *The Principles of Forensic Medicine, systematically arranged and applied to British practice* (London: T. & G. Underwood, 1821) 454, note.

> This was a happy marriage for four years . . . Her ardor died in 1657 . . . She accused him of impotence and took her complaint to the Lieutenant-Civil du Chatelet . . . [59]

The case was referred to the court and both were found to be "normal" by the official examiners. The most likely reason that this case was accepted for trial on the basis of impotence when Marie did not claim to be virginal was that Huguenots, which they were, at this time were not held strictly to canon law.[60] The husband, René, insisted on a congress, which was held in the home of the bath-house keeper in the presence of five physicians, five surgeons, and five midwives.[61] It ended after four hours of failure.

He asked the court to order a second congress, but this was denied and in 1659, the second year of litigation, the marriage was annulled. René was forbidden to remarry and was ordered to return the dowry and revenue he received after the marriage and to pay damages. Marie quickly married another marquis, by whom she had three daughters. René obeyed the court in regard to making the financial restitution, but also remarried in the same year. His union with Diane de Montault resulted in seven children! In 1675 the couple obtained a decree which legalized their marriage of sixteen years and legitimized their children. Thereupon, de Langey filed a civil suit whereby he sought to recover some 65,000 livres from the estate of his first wife, now five years deceased. This litigation lasted one and one half years. During the argument the court was asked to abolish congress because of its unreliability. The procedure had, for one, unjustly stigmatized a nobleman who subsequently proved both his potency and fertility, as had already been adjudicated in 1675. The ruling was signed on February 18, 1677 by Guillaume de Lamoignon (1617-1677), Premier President of Parliament to Louis XIV. The financial claim was denied, but all judges were warned henceforth to refrain from ordering congress. The honor, if not the funds of René, Marquis de Langey, had been reestablished.[57]

59. F.G. de Pitaval, op. cit. (note 36), pp. 184-185.

60. The Huguenots were permitted a considerable degree of religious freedom from 1598 until 1685.

61. In another instance of congress, which took place in 1578, three each of physicians, surgeons and midwives attended. V. Tagereau, op. cit. (note 38), p. 31.

According to L.F. de Lignac (1740-1809), after the use of congress was abolished, French law again prohibited a wife from accusing her husband of impotence if a medical examiner had determined that he had normal genitalia. Although de Lignac was opposed to the reinstitution of congress, he also found that the contemporary law

> . . . is much too general; while the design of marriage being to augment the number of individuals, a man properly conformed in appearance may be *sterile*, or even impotent . . . The inductions which we still draw from the part that essentially distinguishes the man must be often unjust . . .[62]

We close the discussion of the use of congress in France with an excerpt from a popular satire, written in 1666 by the poet Nicolas Boileau-Despreaux (1636-1711). This is a translation published in 1712 wherein references to the judiciary were Anglicized.[63]

> No Eagle does upon his Peerage sue,
> And strive some meaner Eagle to undo,
> No fox was e'er suborn'd by Spite, or Pay,
> To swear his Brother Fox's Life away:
> Nor any Hind, for impotence at Rut,
> Did e'er the Stag into the Arches put;
> Where a grave Dean the *Congress* might ordain
> And with that Burlesque Word his Sentence stain:
> They do no dreadful *Quo Warranto* fear
> No Courts of Sessions, or Assize, are there,
> No Common-Please, Queen's-Bench, or Chancery-Bar:
> But happier they, by Nature's Charter free,
> Secure and safe, in mutual Peace agree,
> And know no other law, but Equity.

Two eighteenth-century German cases illustrate the use of medical experts during this later time and cast doubt on the allegations that the use of congress had been limited to France and had ceased during the previous century. According to Albrecht von Haller (1708-1777), the

62. L.F. deLignac, *De l'homme et de la femme, considérés physiquement dans l'état du mariage* (Lille, 1772) 262; translated into English as *A Physical View of Man and Woman in a State of Marriage* (London: Vernon & Hood, 1844) 267.

63. N. Boileau-Despreaux, *The Works of Monsieur Boileau Made English from the Last Paris Edition* (1666; first English trans., 1682; repr., London: E. Sanger, 1712) 1: 209-230, Satire VIII; the quoted passage is on pp. 218-219.

German forensic procedure was much to be preferred to the former French practice:

> In Germany, where the judicial practice never has learned to convert a courtroom into a breeding stall, such examinations are undertaken much more modestly. One patiently listens to the woman or to her attorney when they present the proofs on which the alleged frigidity of the accused is based and makes a decision only after the examination has been accomplished by experienced physicians and surgeons. If the accuser be a virgin then all signs of virginity, expecially the hymen, must be found uninjured at the examination. However, in a widow or a woman who had previously been known by a man this, of course, no longer exists and the examination gives a less certain result.[64]

The first case was referred to the medical faculty of the University of Halle, in 1721. Marcella, who was eighteen, claimed that she was still a virgin after one and one half years of marriage to Titius and was seeking a medical opinion as to whether she had grounds for divorce. Titius had previously agreed to undergo such examination. Because he was declared normal, Marcella then deferred further inquiries. But because their sexual relationship did not improve she now offered to be examined to have her virginity proven. In addition:

> Marcella seeks a still closer and surer proof from Titius of his alleged prowess in marital intercourse, especially since Titius wants to avoid a repeated thorough examination.

In this context Marcella submitted four questions to the Faculty.

> 1) Does not sexual impotence of a husband according to law have to be proven by visual inspection?

This was answered affirmatively with the following additional justifications:

> . . . it is all the more necessary for the advancement of the truth and a substantiated verdict for all misunderstanding to be dispelled and for successful treatment to be discovered whereby such impotence can sometimes be corrected. Such inspection may be undertaken as frequently as may be necessary for this purpose, especially when the forensic

64. A. von Haller, *Vorlesungen über die gerichtliche Arzneiwissenschaft. Aus einer nachgelassenen lateinischen Handschrift übersezt* (Bern: Neue typographische Gesellschaft, 1782) 1: 241.

> physicians come to agree that the impotence can be corrected by the art of medicine, so that the marriage not be dissolved. Titius, therefore, cannot refuse to submit to such a visual examination, especially since Marcella voluntarily wants to submit to such an inspection of her person by a licensed midwife to prove for her part that no natural obstacle which could impede marital intercourse is to be found on her body, and to have her intact virginity recognized.
>
> 2) Is it not correct for physicians and surgeons to undertake such an examination of such a husband, and particularly whether he is able to have penile erections?

This also was affirmed and the assurance given that

> . . . this runs all the less against propriety because the examination is not only useful to Titius and Marcella, but is absolutely necessary to decide the whole controversy. The practices of decorum and honor are not contravened because such an examination is undertaken quite extraordinarily and with all precaution.
>
> 3) By what manner and means is such a preliminary examination to provoke penile erection to be undertaken?

This was answered with a clear recommendation for congress, although the term was not used.

> . . . when the genital parts are found to be without lack or deformity according to their external appearance, the accusation of impotence of either the masculine or the feminine sex is by no means sufficient. In those men it certainly depends upon whether they can demonstrate their potency by carnal copulation, as well as by adequate erection of the member and also by adequate ejaculation of sperm. And since Titius up to now has steadfastly denied that he has any deficiency in these matters, he will have to resolve and undertake such a test in the presence of knowledgeable physicians because one may suppose that it will reveal the condition of his nature most easily and quickly. Thereafter, such persons must attest whether this experiment has achieved the desired effect and particularly whether a lukewarm application to the genital parts would be useful . . .

Finally, Marcella demanded to know

> 4) How and by what sort of persons of the male or female sex will the inspection of Titius be undertaken; especially, however, by what method and means will it be determined that semen was ejaculated?

This question was not answered directly.

> . . . this inspection is most properly conducted by sworn physicians who are also to be used as expert witnesses in this contemplated examination.

> It would also not be inappropriate to this case if Titius, to facilitate this test, would use a supportive for the nerves and a gentle diuretic in so far as he perceives any deficiencies among the needs of his nature . . . if Titius, according to his other psychologic and physical behavior otherwise finds himself healthy and vigorous . . . he could be cured by suitable medications and God's help.[65]

As we have seen, the faculty assured Marcella that her husband could not refuse to be examined and that this examination might have three parts: first, inspection by physicians of the unstimulated genitalia; evaluation, by undescribed methods, of the erectile capacity; and ability to engage in coitus. Marcella was less modest than the professors from whom she sought information. Her question about how ejaculatory potency could be proved, assuming that erectile potency was demonstrated, remained unanswered. The over-all tone of the faculty was to recommend medical treatment of the impotence and to effect a reconciliation.

The second case is more typical in that the medical consultation was requested by a court to assist in a trial. In 1765 a royal Saxon chancery court requested an advisory opinion of the medical faculty of the University of Göttingen in the divorce suit of Catherine against Christopher. The court documents indicate that they had been married for four years and that each accused the other of persistent sexual impotence. Catherine claimed that she still was virginal because of her husband's partial erectile deficiency. Although "he had sprayed her body with a lymphatic fluid," he was incapable of intromission. Christopher denied her charges and made the counterclaim that she had steadfastly refused to complete intercourse, and he therefore wondered whether she had some malformation which made this impossible. Because of the conflicting testimony a physician had been ordered to examine both spouses. He found the genitalia of both to be entirely normal, and that "not the least sign of virginity was detectable."

The faculty reasoned

> . . . that both spouses accuse each other groundlessly of absolute impotence, and that this is only relative and in part due to a mutually shared antipathy . . . We do not at all doubt the arousability of the man,

65. F. Hoffman, *Medicina consultatoria* . . . (Halle: Renger, 1721), "Casus III. Cum responso facultatis de impotentia virili," 1: 69-73.

> even though it was not observed by the physician . . . Should other, more direct evidence be required whether penile erection occurs or is deficient in this man this would have to be furnished either by masturbation short of ejaculation, arranged by the physician, whereby the crime of onanism is not committed; or, since he frequently experiences spontaneous penile erections, it can also be accomplished if Christopher would call a good friend as a witness at such a time.
>
> However, the recommendation [not quoted] by the physician of a judicial witnessing of cohabitation should not be approved, in part because of the excessive animosity between this couple, in part also because the natural inhibition of the man which intrudes into such a test can easily have a detrimental effect. Furthermore, the allegation of the woman that she still is a virgin has no merit, in view of the size of the vulva and the all too relaxed vagina, which are sufficient signs of prior coitus.

The verdict was pronounced by the Legal rather than the Medical faculty, indicating collaboration of the two in such matters. Divorce was justified

> . . . because, according to the ecclesiastic court, when married couples have lived together for more than three years and are unable to engage in cohabitation the legitimate and just termination of the vow [of marriage] takes effect, which is also in accord with Protestant practice. The truth cannot be properly revealed in other ways in such secret proceedings, although a stern admonition to avoid perjury will be necessary so that such an oath not be sworn frivolously to gain the intended divorce. After this has been sworn, according to the canon laws cited above, the annulment of matrimony, upon petition of that party who complains about the other's impotence is not to be denied.[66]

Like René and Marie de Langey, Catherine and Christopher both proved to be fertile. She remarried two years after she had obtained the annulment and during the four years before she was widowed bore two children. Three years later she married again and had one more child. Christopher, seven years after having parted from Catherine, married a woman who two years earlier had borne a son whose paternity he acknowledged.[66]

What do these examples reveal about German attitudes and practices regarding divorce, at least in the eighteenth century? First, the triennium of allegedly impotent cohabitation was adhered to as a prerequisite if a

66. J.H.G. Schlegel, "Altes und Neues aus dem Gebiete der gerichtlichen Arzneikunde, aus ungedruckten Akten," *Ann. d. Staatsarzneikunde*, 4 (1839): 119-150. See pp. 131-136.

divorce was to be based on impotence. Marcella after one and a half years of marriage was only inquiring whether she had sufficient grounds to sue for divorce. Second, the forensic examination of women, at least in some jurisdictions, was no longer entrusted to midwives, but was assigned to physicians. Third, both cases strongly suggested that congress, although it might never have been authorized in the German states, probably was practiced after it had been abolished in France! In the case of Marcella and Titius the faculty of the University of Halle itself recommended congress when both litigants had been found to be normal anatomically. "Carnal copulation" would have to be undertaken "in the presence of knowledgable physicians," and, furthermore, following fourteenth century practice[35] rather than that of the seventeenth century,[41] the medical witnesses were to decide whether warm applications to the genitalia would facilitate the performance. In the case of Catherine and Christopher the "judicial witnessing of cohabitation" had been recommended by the court-appointed physician. The faculty of the University of Göttingen advised against this, not because of a legal barrier, but rather because of the unfairness of the procedure to the man — the same argument which Paré had introduced two centuries before. Finally, the recommendation that a male friend stay with Christopher at night to witness spontaneous erections was in keeping with legal precedent. For example, in the Duchy of Württemberg the court could appoint a surgeon to make such observations which, if positive, could serve as evidence against allegations of impotence.[67,68]

Instances of divorce because of sexual incompatibility following acknowledged consummation, such as that of René and Marie de Langey, were extremely rare before the nineteenth century. If it could not be sublimated as a "blessing", it was to be regarded as one more burden which the couple must share.

Nineteenth-century German practice; history of English divorce

The divorce statute of the Austro-Hungarian (Hapsburg) monarchy of 1783 did not deviate significantly from earlier European divorce laws. The first of the three paragraphs which pertain to impotence

67. J.D. Metzger, *Kurzgefasstes System der gerichtlichen Arzneywissenschaft,* 4th ed., revised by C.G. Gruner (Königsberg: A.W. Unzer, 1814) 507-508.

68. A. Henke, *Lehrbuch der gerichtlichen Medicin* (Berlin: J.E. Hitzig, 1812) 80-81.

(#37) gives either spouse who is aggrieved by the "impotence" of the other the right to sue for annulment. Then it stated:

> para. 38. Now, in such suits the court shall never consider it sufficient that the impotence of the other party alleged by the complainant be judicially acknowledged by them. Rather, the truth of the alleged impotence must always be investigated by a variety of persons, such as physicians, surgeons, or midwives.
>
> para. 39. If reliable signs of a chronic impotence are found by this examination, whether this be total or exist only in relation to the spouse, then the marriage shall be declared null and void. When, however, it is impossible to determine reliably from the external signs whether the impotence is temporary or constant and persistent, then the couple shall continue to live together for another three years and shall be divorced after this period has transpired only if the impotence has persisted until then.[69]

We see that 1) the allegation of impotence had to be investigated by medical professionals, that their number was unspecified and that the three categories implicitly were considered equal. 2) "Chronic impotence" was neither defined nor were the means of its identification specified. The interval before the court would accept such a case probably was left to its discretion, but must have been much shorter than three years, since it was the responsibility of the medical examiners to recommend whether the triennium needed to be invoked. 3) Although it was not specified, it is safe to assume that only marriages which allegedly were unconsummated were to be considered.

Perhaps the earliest break with this tradition occurred in the Prussian legal code of 1794. Paragraphs 696 and 697 stated:

> An inability to fulfill the marital duty which has developed during marriage, when it is total and incurable, also is a ground for divorce.
>
> The same holds for other incurable ailments which arouse disgust and aversion, or totally interfere with the fulfillment of the purpose of marriage.[70]

These sentences, of undoubtedly Protestant authorship, resonate with the writing of Paolo Zacchia (1584-1659), a physician to two

69. W. Kunkel, G.K. Schmelzeise and H. Thieme, *Quellen für neuere Privatrechtsgeschichte Deutschlands* (Köln/Graz, 1969) 2: 393, "Polizei und Landesordnugen."

70. H. Hattenbauer, *Allgemeines Landrecht für die Preussischen Staaten von 1794* (Berlin, 1970) 368.

Popes, who has been regarded as "the father of legal medicine." In explaining impotence to lawyers 173 years before the promulgation of the Prussian code he wrote:

> A woman, moreover, can be the cause of a man's complete inability to copulate if she gives off a foul smell, or if she does not take pains to be clean and neat, or if her husband feels that he is held in contempt by her and she has a feeling of aversion to him. And these are all, or at least the most obvious causes that induce coital impotence in a man. It is therefore worth the effort to cite all of them here in order that we may know which causes can be removed and which cannot. In fact, it is of the greatest importance for lawyers to know this, since when coital impotence can be remedied with the aid of medicine a marriage would not be dissolved, while if it could not, the marriage would be irretrievable.[71]

Zacchia considered the possibility of aversion a unilateral problem for which the wife was to blame. This is not implicit in the later Prussian statute. Nevertheless, it was the lawyer's duty to facilitate reconciliation rather than divorce, and he was to obtain the aid of the medical profession to achieve this.

The Prussian law increased the responsibility of the physician. Since no minimum duration of impotence was specified, he had to determine in healthy persons who had been sexually active not only whether impotence was present, but whether it was likely to be permanent, and had to establish criteria to make this judgment. He also was to determine whether ailments which cause aversion from intercourse — a concept open to broadest interpretation — were curable or permanent.

In England divorce remained an extreme rarity from the eleventh until the latter half of the nineteenth century. For example, in Rochester five divorce cases were heard between 1437 and 1440, while in the consistory court of York only twelve cases were recorded in the entire fifteenth century.[44] Despite the effort initiated by Henry VIII to revise the divorce law,[72] medieval canon law, with few exceptions,[73]

71. P. Zacchia, *Quaestiones medico-legales*, 4th ed. (Avenione: I. Piot, 1655) 128.

72. Henry VIII (1491-1547) established a commission headed by Archbishop Thomas Cranmer (1489-1556) to revise the body of canon law. This document, *Reformatio Legum Ecclesiasticarum*, would have permitted divorce based on adultery, desertion, cruelty and "mutual hatred." There were to be more grounds for obtaining a divorce *a vinculo matrimonii*, which would permit remarriage; divorce *a mensa et thoro*, which we would call a legal separation since it prohibited remarriage, was to be abolished. The necessity to prove three years of impotent cohabitation without consummation was not altered, nor

continued to govern the possibility of divorce until the Reform Act of 1857 removed divorce from ecclesiastical jurisdiction. The rigidity of English ecclesiastical courts is exemplified by the following ruling from the beginning of the nineteenth century, cited by Bishop:

> If the parties should be divorced on the ground of impotence, and both should have children by the second marriage these second marriages must by law be set aside, and the first marriage, declared valid, for when the church appears to have been deceived the sentence must be revoked.[74]

Here we see the eleventh-century edict of Bishop Burchard invoked!

There is no evidence that congress ever was used in England to assess potency. However, records from Canterbury and from York from the first half of the fifteenth century describe a unique procedure intermediate between physical examination and congress. "Honest women," presumably midwives, but certainly not prostitutes, were authorized to evaluate men whose wives had accused them of impotence. The evaluation consisted of members of a committee of seven using their bodies to attempt to elicit sexual arousal. Helmholz cited one such report:

> The same witness exposed her naked breasts, and with her hands warmed at a fire, she held and rubbed the penis and testicles of the said Johannis. And she embraced and frequently kissed the same Johannis,

did chronic impotence in a consummated marriage become actionable. Henry died before the deliberations were completed. Even though Edward VI (1537-1553) approved the new code, Parliament did not act on it and thus the medieval laws remained in effect. a. J.P. Bishop, *Commentaries on the Law of Marriage and Divorce and Evidence in Matrimonial Suits* (London: W. Maxwell, 1852) 219; b. D.S. Bailey, op. cit. (note 17), pp. 212-217.

73. In the seventeenth century a method was developed to circumvent the ecclesiastical prohibition against remarriage after divorce, at least in cases of divorce due to adultery. First a divorce *a mensa et thoro* had to be granted by the ecclesiastical court and a successful suit brought against the adulterer. Then a private bill for divorce *a vinculo* could be introduced in the House of Lords. Prior to 1715 only five such complex and expensive procedures were successful. During 1716-1775 there were sixty, 1776-1800 there were seventy-four, and 1801-1850 there were ninety. See: a. W. Blackstone, *Commentaries on the Law of England,* ed. by G. Sharwood (Philadelphia: J.B. Lippincott & Co., 1879) 1: 441, note; b. W.S. Holdsworth, *A History of English Law* (London: Methuen, 1903) 1: 623.

74. J.P. Bishop, op. cit. (note 72a), p. 44, note.

> and stirred him up in so far as she could to show his virility and potency, admonishing him that for shame he should then and there prove and render himself a man. And she says, examined and diligently questioned, that the whole time aforesaid the said penis was scarcely three inches long . . . remaining without increase or decrease.[75]

If showing his *potency* meant actually engaging in coitus with one of the women then this procedure would have been virtually identical with congress. However, since they were "honest" (ie., honorable) women," it seems more likely that merely the elicitation of an erection was meant. After the women had decided that a sufficient test had been administered, they probably reported to a physician, who would then report the result to the court.

If a suit for annulment was based on inability to effect consummation because of a physical abnormality of the spouse, the existence and significance of the defect had to be unknown before the marriage and the suit had to be brought fairly soon. According to Bishop:

> Delay by the husband of even sixteen months has occasioned suspicion: and it has been held that lapse of time, though it does not appear precisely what time, may operate as an absolute bar. But the wife is not held to the same promptness in bringing her suit, as the husband; the modesty of the sex may account for forbearance on her part; and where the woman commenced proceedings twelve years after the marriage, relying, however, upon proof of non-consummation after a triennial cohabitation, no objection was made on account of the delay.[76]

In the period from 1760 to 1820 only three men sought annulment because of their wife's genital anomaly and each plea was unsuccessful.[77]

If no physical defect was found, the triennium of allegedly impotent cohabitation having been fulfilled, and the court accepted the suit, the burden of proof was on the plaintiff both to establish that sexual intercourse had never been completed and that no remedy could cure the dysfunction. At the beginning of the nineteenth century a board of two physicians and one surgeon, or vice versa, but no midwife, examined both litigants. They were nominated by the plaintiff and, upon approval by the defendant, were sworn by the court. If the defendant avoided examination, for example by leaving the jurisdiction,

75. R.H. Helmholz, op. cit. (note 44), pp. 89-90.

76. J.P. Bishop, op. cit. (note 72a), p. 190.

77. Ibid., p. 181.

this requirement could be dispensed with. In that event depositions by two medical witnesses "and proof that the woman's health had suffered" could satisfy the court.[78]

It was understood since the Middle Ages that the presence of erectile capacity neither proves the ability to engage in coition nor ejaculatory potency. At the beginning of the nineteenth century ethical constraints prevented the evaluation of both. Witnessed attempts at intercourse with the spouse were recognized to be unreliable, both because of the effect of embarrassment toward and by the viewers, and hostility toward the spouse whose suit had brought about this confrontation. According to E.G. Elvert, a German physician, potency was not to be tested with a prostitute, not because of laws against extramarital intercourse, but because it would demean the forensic physicians in effect to have a prostitute as a colleague. Testing ejaculatory potency by self-masturbation was proscribed by the acknowledged interpretation of the scriptural story of Onan (Genesis 38:9),[79] as well as being "entirely contrary to health."[66] "Manipulation by a physician dishonors the dignity of the person and of Medicine."[79] The use of stimulants such as

> . . . cold baths, anointing with oil of henbane, rubbing, brushing, beating with nettles or with irritating things, electricity and galvanism, among others, are inadequate and, at the most, prove the inability to sexual intercourse, but not the lack of semen, which is necessary for impregnation.

The author was distinguishing obliquely between erectile and ejaculatory potency. This passage, which was published in 1814 in a German textbook of legal medicine, concluded:

> It finally is to be remarked that there are up to now causes both of impotence and sterility which remain hidden from the physician and about which he cannot venture an opinion, because for example, they cannot be recognized by inspection, because there are secrets of the marital bed, etc. The external appearance also is not always a proof of simulated impotence or defence against impotence falsely accused.[66]

78. Ibid., pp. 197-198.

79. E.G. Elvert, "Die unzulässigkeit ärztlicher Entscheidungen über vorhandenes männliches Vermögen," *Jahrb. d. Staatsarzneykunde* 2 (1809): 102-115.

At about the same time the English jurist, William Scott, Lord Stowell (1745-1836) wrote in regard to the necessity for the courts to have the authority to order medical examinations in divorce litigations reminiscent of Pitaval:

> It has been said that the modes resorted to for proof on these occasions are offensive to natural modesty. But nature has provided no other means, and we must be under the necessity of saying that all relief is denied, or of applying the means within our power. The court must not sacrifice justice to notions of its own.[80]

Conclusion

In view of the ecclesiastical attitude toward sexuality and its role in marriage, was it paradoxical that so much deliberation was devoted to the assessment of impotence? The knowledge that sexual intercourse is necessary for reproduction created a fundamental conflict with the belief in the sinfulness of reproductive behavior. Only the degree of sinfulness under various circumstances was open to debate. Consequently, what was to be the purpose of marriage? Was it primarily for procreation and child-rearing or for general mutual sustenance, from which sexuality should so far as possible be eliminated? Furthermore, how important should sexual satisfaction be?

Sexual activity was deemed less sinful when it occurred within marriage than extramaritally. Patristic and to a somewhat lesser extent medieval theologians taught that, ideally, both spouses should agree to celibate cohabitation. However, in implicit acknowledgement that most people would not adhere to permanent celibacy, one justification for marriage was that it provided an institution which minimized the sinfulness of sexual activity. If only one partner, for whatever reason, chronically refused to "pay the marital debt," the other was likely to feel deprived. Therefore, annulment could be permitted if there had been *no* sexual intercourse, primarily to spare the aggrieved spouse from the temptation to commit the mortal sin of adultery. The aspect that is most puzzling now is why the act of consummation, if it did not result in a successful pregnancy, altered the situation. We would think that prolonged impotence would be no less a temptation for adultery by the other spouse if it began after consummation. Nevertheless, the impor-

80. J.P. Bishop, op. cit. (note 72a), p. 194.

tance that was assigned to the first sexual intercourse made it crucial to seek a diagnostic method to verify whether it had occurred.

Four types of assessment were potentially available: 1) Trial by ordeal, which was abolished in the thirteenth century without acknowledgement of its biologic irrelevance. 2) Examination of the external genitalia continued to be practiced, but was soon recognized to resolve very few cases. 3) Masturbation was a sin in itself and hence could not be employed. 4) The remaining method was congress, the attempt at sexual intercourse which could be vouched for by witnesses. We have described this in detail and presented evidence that this practice probably was not limited to France or abandoned in the seventeenth century, as has been assumed. The psycho-physiologic problems inherent in such a forced encounter between two persons who probably were incompatible were discussed at length. However, the obvious alternative of performing the test with a surrogate (i.e., a prostitute), except as cited[31, 79] was not given serious consideration. Since the availability of prostitutes was never denied, two alternative explanations exist: the pride of the court would have been injured were it to have to rely on the testimony of such sinners, or a trial with anyone other than the wife would subject the heretofore innocent litigant to the mortal sin of adultery.

Because of the interaction of biological and cultural factors the problem of how to prove the absence of sexual intercourse remained refractory after one and a half millenia of effort. A solution was finally reached by modification of divorce laws so that consummation itself no longer made a marriage virtually irrevocable.

University of Pittsburgh School of Medicine/
Veterans Administration Medical Center
Pittsburgh, PA. 15240

and

Falk Library of the Health Sciences
University of Pittsburgh
Pittsburgh, PA. 15261

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ESSAY-REVIEW

CRISSEY, JOHN THORNE, M.D. and PARISH, LAWRENCE CHARLES, M.D. *The Dermatology and Syphilology of the Nineteenth Century,* with an introduction by Walter B. Shelley, M.D., Ph.D. (New York: Praeger Publishers, 1981). 439 pages, illustrated. Price $47.50.

Reviewed by HERMAN BEERMAN, M.D.

Crissey and Parish prove by this volume that the history of the development of a discipline of medicine can read like a novel. They trace with care, scholarship, wit, and humor the growth of dermatology and venereology from the earliest times. They concentrate on the 19th century, when dermatology attained the status of a specialty. The style is such that one has the feeling of "being there" when the events took place. The illustrations contribute to this illusion. Socio-economic and political history of the times are correlated with the rise of dermatology.

The book raises many questions concerning priorities of discovery. It points out that history repeats itself — compare Gale's faking of data on scabies with recent faked experiments in two of the most prestigious institutions of higher learning in the United States (e.g. "News and Comment," *Science* 215 [January 29, 1982]: 478). In short this is not a cut-and-dried text with nothing more than a catalogue of biographies, descriptions of clinics and hospitals in various communities, or the description of a few diseases. Rather it is the story of the development of a discipline of medicine.

The data presented are available in numerous individual sources, often in brief form only. Some of these sources are Winkler's description of the Hôpital St. Louis in Paris; descriptions of diseases by Parish and Haviland, and by Rostenberg; many writings on individual dermatologists by Parish and by Hollander; books and papers by such dermatologists as Bechet, Pusey, Dennie, Crissey and Shelley; writings on local communities by Friedman, Beerman, Buley, and many others. This sketchy listing gives some notion of the variety and quantity of materials that are vividly combined between the covers of the book.

The reviewer would like to see the first part of the history developed as a separate volume. The nineteenth century might well be volume two and modern dermatology could fill volume three. All three volumes should contain excellent biographies, such as are to be found in the present offering.

The use of "Master" for historic figures is overdone. When does a physician become a master? Is this usage equivalent to the diplomate of a specialty board or is it an expression of affection or respect like the use of "Maestro" to designate the leader of an orchestra?

The index is inadequate and poorly edited. Much of the jampacked content of the book has been bypassed. On page 435 the O's are mixed with the P's; "Lorry" comes after "Louis." The titles of the chapters are well thought out and catchy. The use of "Lues I," "Lues II" and "Lues III" for syphilis does not indicate the three "stages" of syphilis but rather three phases in the history of syphilis. This should be indicated more clearly. Although the older American Dermatologic Association (1876) is noted, no reference is made to the late nineteenth-century British Association of Dermatology. The reviewer, an admirer of Erasmus Wilson, would have liked to see some prominence given to "Obelisk," a nickname given Wilson for bringing "Cleopatra's Needle" to London (Moxon). The coverage of Scandinavian contributions is meager. For example, sarcoid is not mentioned.

The book contains 21 chapters. A prologue encompasses in 15 pages the history of dermatology from the beginnings and contains what purports to be the earliest prescription for the skin from 1600 B.C. — the Edwin Smith Papyrus — but Noah Kramer of the University of Pennsylvania has mentioned a Sumerian poultice as the oldest prescription. The same chapter gallops through the development of dermatology in Egypt, Greece, Rome, Spain and the Arab world. It includes material on Daniel Turner, Jean Astruc, Anne-Charles Lorry, and François Oliver Rayer.

Chapter II traces the "Austrian seeds in English soil." Plenck, a surgeon, influenced Willan by his attempt "to enumerate and describe accurately the various forms that can be assumed by the lesions of skin eruptions and to classify skin diseases according to forms of the lesions exhibited." This began the battle of classification which still persists. Other figures in England in this connection were Bateman and Jonathan Hutchinson. Chapter III deals with French contributions. Paul E. Bechet stated that modern dermatology began in France in 1800 with Alibert. Alibert, Biett, and Cazenave are prime examples of French dermatology, which the reader may contrast with the dullness of medical life and thought in 1982. This chapter gives the reader a real feel for the times. Chapter IV details the story of the itch mite (repeatedly and incorrectly designated as an insect). The scabies story repeats itself. In recent years the prevalence of scabies increased but the causative arthropod has often been difficult to find.

Chapter V, called "Lues I," is the first part of the history of syphilis. In those early days gonorrhea was part of the dermatologist's

domain. John Hunter's unfortunate influence carried over for a long period, until Ricord and others showed that syphilis and gonorrhea are separate diseases. In Chapter VII Simon tells the story of *Demodex folliculorum*. This organism is still a cause of controversy. "The Healthy Skin," a special interest of Erasmus Wilson, is the title of Chapter VIII. Chapter IX contains a dialogue on dartre and tetter. One of the most outstanding dermatologists of all time, Ferdinand von Hebra of Vienna, is discussed in Chapter X. Hebra was an extraordinary teacher and clinician, with Sherlock Holmes tendencies. He is regarded as the founder of modern dermatology. The birth of bacteriology is dealt with in Chapter XI. Chapter XII contains the story of scrofula, tuberculosis and lupus vulgaris. "Lues II" (Chapter XIII) gives special attention to Jonathan Hutchinson and congenital syphilis. "An Encore for the Cryptogams" (Chapter XIV) carries forward the story of mycology. "Late Century Trends and Leaders" (Chapter XV) covers a galaxy of leaders, Auspitz, Neuman, Fournier, Vidal, and others. Americans are recognized as masters in Chapter XVI, which mentions, among others, Bulkley, White, Noah Worcester, Piffard, George Henry Fox, and Louis A. Duhring.

The master of dermatopathology, Paul Gerson Unna, is described in Chapter XVII and his works are discussed in detail. "The Legacy of Aetius" (Chapter XVIII) describes the eczema problem from earliest times to the modern concept of atopic dermatitis, which is still under extensive investigation. Chapter XIX, "Lues III," is the story of modern syphilology, beginning with Metchnikoff and Roux. In a short period of time during the early 20th century the causative organisms of syphilis, serologic tests, and effective therapy were introduced. Chapter XX contains handy reminders of some 19th century accomplishments in dermatology. Chapter XXI is a summary.

This book emphasizes William Bennett Bean's estimate of history:

> It is easy for us to look back at our predecessors and recognize their follies. If indeed a knowledge of history enables us to avoid some of the errors of the past, it is because language and books help man to profit by accumulated experiences. But the somber fact is that though man may so profit, unhappily rarely does he take up the option. For it is a hard and lonely thing to try to gain knowledge and understanding. Indications that man has benefited greatly from assimilating the past are meager and threadbare. Just as each moment of each age in history must see the past and dream of the future in terms of its own image and its own picture of reality, so the demand for a scientific view of the science of the past and its impact on man's thinking and man's action must be seen in the light of our conception of modern science. Such a view is basic in the education by which any contemporary person gets even a glimmering of an understanding of general history.

The reviewer is proud of this scholarly book not only because it is a fine survey of 19th century dermatology but also because both authors were his students.

Department of Dermatology
University Hospital
University of Pennsylvania
Philadelphia, PA 19104

ESSAY-REVIEW

CARLSON, ERIC T., WOLLOCK, JEFFREY L., and NOEL, PATRICIA S. (eds.) *Benjamin Rush's Lectures on the Mind.* Philadelphia, American Philosophical Society [*Memoirs*, v. 144], 1981. 736 pp., 1 fig. $15.00.

Reviewed by STANLEY W. JACKSON, M.D.

BENJAMIN Rush was a man of many gifts, most of them interesting. A significant politician in the formative years of the United States of America and a leading practitioner and teacher in the formative years of American medicine, Rush was also a signer of the Declaration of Independence, an energetic and committed social reformer, a professor of chemistry, a college founder, a church founder, and sufficiently concerned about and involved with the care of the insane as to have been termed "the father of American psychiatry."

In these *Lectures on the Mind* Dr. Carlson, Mr. Wollock and Dr. Noel provide us with a significant section from Benjamin Rush's version of the *Institutes of Medicine.* In a developing tradition given its eighteenth-century shape by Boerhaave, the Institutes of Medicine were the lectures on the theory of medicine, as distinct from those on practical or clinical medicine. As others would put it, perhaps more precisely, they constituted an introduction to clinical medicine, and have some parallel to our notion of preclinical studies. For Boerhaave they included physiology, general pathology, semiotics, hygiene, and therapeutics. Influenced by the Boerhaavian tradition, Cullen, Rush's teacher at Edinburgh, included the same five topics under three headings — physiology, pathology (including semiotics), and therapeutics (including hygiene). But Rush limited the content of his Institutes to physiology and pathology. As part of his lectures on physiology, he gave considerable attention to the senses, the mind, sleep, and dreams, and it is this material that the editors have provided for us as the *Lectures on the Mind.* For the most part brought to print for the first time, these lectures constitute the theory of psychology missing from Rush's *Medical Inquiries and Observations Upon the Diseases of the Mind* (1812), the first American book on psychiatry.

Already a respected and established teacher, Rush was appointed in 1791 to the professorship of the Institutes of Medicine. From the very start he worked hard at developing this course. As noted in his autobiography, "I began to prepare for the duties of my new Professorship by reading Boerhaave, Dr. Haller, Hunter, Gregory, Cullen's

manuscript lectures, and many small tracts upon physiological subjects. From none of them did I derive so many useful hints as from Dr. [David] Hartley's treatise upon the frame of man. About a week before the meeting of the classes, I sat down to compose my lectures, and during the winter in the midst of constant business, I finished and delivered a course of lectures upon the Institutes of medicine. Never before had I stretched my faculties to such an extent. I slept but little, and lived sparingly during this severe paroxysm of bodily and mental exertion." Rush was to continue with this dedicated approach to the tasks of a teacher, tinkering with and revising his Institutes of Medicine, including these *Lectures on the Mind,* over nearly two decades. Thus we have here the fruits of many years of teaching medical students.

We also have here the practical reflection of Rush's strong convictions regarding the importance of physicians having a sound understanding of the development and function of the human mind. Boerhaave had given a certain limited attention to such matters, and Cullen somewhat more. But Rush extended this trend considerably further. He emphasized the importance of this knowledge for understanding the diseases of the mind, for grasping the often important place of psychological factors in a wide range of diseases, for knowing one's patient for the purposes of having a cooperative patient and a sound therapeutic enterprise, and for developing the relationships necessary in the building and maintaining of a successful medical practice.

In Rush's psychology there is clear evidence of the influence of Locke with his mechanical notions, his associationism, and his view that there were no innate ideas and that man's knowledge derived initially from sensations stimulated by contact with the external world. Even more prominent is the evidence for the influence of Hartley. His sensationalist perspective had perhaps a more direct impact than that of Locke. His development of associationism was of crucial importance for Rush. His mechanistic physiology of the nervous system was significant. While many readers would recognize these various Hartleyan threads in the fabric of Rush's text, they would be rather more indebted to the editors for effectively delineating the importance of Hartley's religious views to Rush's efforts to integrate his religious concerns with his psychology and his physiology. Also less obvious, but brought out convincingly by the editors, are indications that various French authors were of importance to Rush through their sensationalism and their views on the physiology of the nervous system, particularly Condillac, Cabanis, and Dumas.

In interesting contrast the Scottish philosophers of common sense, especially Reid and Beattie, with their notions of innate inclinations,

were also significant to Rush. Opposed to sensationalism and disagreeing with Hartley on many issues, Reid and his colleagues were nevertheless of considerable importance for Rush. It was their faculty psychology that he specially drew upon, a scheme in which they elaborated a view of the mind as a system of faculties and their functions.

Of course, Rush did not use the term 'psychology.' He coined the term 'phrenology' for the knowledge or science of the mind. While others were to appropriate this term and used it to mean the study of the cranium as a guide to the nature of a person's mental faculties and character, Rush used it in a way equivalent to our 'psychology.' In summary we might say that Rush's phrenology (or psychology) was a faculty psychology which he grounded in the associationism and mechanistic views of Hartley to produce a type of physiological psychology.

Also significant, and perhaps in a more complex way, were the views of William Cullen, Rush's revered teacher at Edinburgh and a leading influence on the medical thought of Rush's time. For some years after his return from Edinburgh, Rush had the views of a faithful disciple of Cullen, even to the point of arousing unfavorable reactions from many fellow physicians in Philadelphia who were much more sympathetic to the, by then, traditional views of Boerhaave. Then, shifting away from Cullen's notions of a nervous power and neurally determined levels of excitement in explaining much of physiology and pathology, Rush gradually developed his own theory of disease, in which disordered excitement was the crucial explanatory factor. He grounded his theory in the notion of life as a forced state, i.e. life as a state of motion or excitement that resulted from stimuli acting upon some quality or substance in animal matter. In this regard, he disclaimed any influence from the theories of John Brown, indicating that he had derived this notion from Cullen, although the latter had subsequently abandoned it. In contrast to Cullen's emphasis on a neural basis for pathology, Rush conceived of the vascular system, particularly the arteries, as the critical element in the normal control and distribution of excitement and in the disordered excitement that led to disease. As the editors state it, Rush had developed a new unitary theory of disease in which "all diseases were but a type of fever brought on by irregular and convulsive motions in the vascular system."

In this interesting and valuable work Dr. Carlson and his colleagues have put us in their debt. Already knowing Dr. Carlson's many fine contributions to the history of American psychiatry, some of them with either Mr. Wollock or Dr. Noel as co-author, we would expect the high standard of scholarship found in this volume. The editors' introductory

material, their identification of persons and writings, their tracing of intellectual themes, and the many other contributions in their scholarly notes are all of absorbing interest and great use to the reader. They have provided us with a singularly helpful sense of background and context for these lectures of Benjamin Rush. And the American Philosophical Society is to be complimented for bringing out this volume by one of its own early members, a man so crucial in the development of so much.

Department of Psychiatry
School of Medicine
Yale University
New Haven, CT 06519

Memoir of George Washington Corner, M.D. 1889-1981

JONATHAN E. RHOADS, M.D.

GEORGE Washington Corner, who came to Philadelphia in 1960 as Executive Officer of The American Philosophical Society, died September 28, 1981 at the age of 91.

He had earned a worldwide reputation in medical science many years earlier as the senior discoverer of progesterone, the basic science discovery, of which one practical application has been the pill taken by millions of women to prevent unwanted pregnancies.

He became a fellow of the College of Physicians in 1964, but his presence among us passed with relatively little notice from the Philadelphia medical community — probably because he was, in his own phraseology, in "the seventh age of a medical scientist" and was devoting himself largely to the history of science and to the affairs of "The American Philosophical Society Held in Phildelphia for Promoting Useful Knowledge."

While not a frequent attender at College functions, he knew a great deal about its library and called on its resources — especially in connection with *Two Centuries of Medicine*, his history of the School of Medicine of the University of Pennsylvania and really of Philadelphia medicine in a broad sense. This he produced at the time of the celebration of the two hundredth anniversary of the University of Pennsylvania's medical school, the oldest medical school in what is now the United States.

While never a recipient of the Nobel Prize, he was a foreign member of The Royal Society in London — a rarer honor albeit less remunerative. He was likewise a member of The Royal Society of Edinburgh.

He became a fellow of Balliol College, Oxford, where he dwelled and taught for the academic year 1952 to 1953 while serving as the Eastman Visiting Professor. He was the recipient of honorary degrees from thirteen institutions of higher learning, including the Catholic University in Chile, 1942; the University of Rochester, D.Sc., 1944; Boston University, D.S.C., 1948; University of Chicago, D.Sc, 1958; Jefferson University, D.Sc., 1971; Rockefeller University, D.Sc., 1950, M.A., 1952; University of Pennsylvania, D.Litt., 1965. His career was further distinguished by invitations to give a number of distinguished lectures: the Vicary Lecture at the Royal College of Surgeons of England, 1936; the Vanuxem Lecture at Princeton, 1942; the Terry Lecture at Yale,

1944; and by a number of medals and awards including the Squibb Award of the Society for Study of Internal Secretions, 1940; the Presidential Award of Merit, 1948; the Passano Award, 1958; the Dale Medal of the British Society of Endocrinology, 1964; the Marshall Medal of the British Society for the Study of Fertility, 1974; and the Welch Medal of the American Association for the History of Medicine, 1975.

He was elected to the National Academy of Sciences in 1940, serving as Vice-president 1953-57, and to the American Philosophical Society in 1940 where he also served as Vice-president 1953-56.

He was President of the American Association for the History of Medicine 1954-55, was Secretary of the American Association of Anatomists 1930-38 and President 1946-48, and served as Managing Editor of the *American Journal of Anatomy* from 1936 until 1940, when he became Editor of the Carnegie Institution's *Contributions to Embryology*. He served as the President of the Seventh International Anatomical Congress held in New York City April 10-14, 1960, and as President of the International Society of Endocrinology in 1964.

Dr. Corner was the grandson of a George Washington Corner, born in 1821, and the son of George Washington Corner, born in 1862, a substantial citizen of Baltimore, Maryland, where our subject was born December 12, 1889 within a few minutes' walk of Johns Hopkins Hospital. He earned his B.A. from Hopkins in 1909 and graduated from its School of Medicine in 1913. The next year he devoted to being an assistant in Anatomy with Dr. Franklin P. Mall; then he took a year as a resident house officer at the John Hopkins Hospital. In 1915 he married Betsy Lyon Copping, a New England schoolteacher whom he had met serving in the Grenfell Mission in Labrador during the summers of 1912 and 1913. They had two children: George Washington Corner, Jr., now Professor of Obstetrics and Gynecology at the University of Alabama in Huntsville, and Hester Ann, who was close to earning her Ph.D. at Yale when she fell ill with acute myelogenous leukemia and died in eleven days after the diagnosis was made.

After experience in laboratory science and in clinical work, George Corner made a well-tested decision to stay in basic science. He was tempted later in life to switch to a clinical discipline, but he stayed true to his preference.

From Hopkins he went to the University of California at Berkeley for four years as assistant professor of anatomy, then back to Hopkins for four years, as associate professor, and then to the new medical school at the University of Rochester, where he became the first professor and chairman of anatomy in 1923, and where he remained for 17 years.

His final anatomical post was as Director of the Department of Embryology of the Carnegie Institution of Washington. The Carnegie

Institution has a number of departments in diverse fields dispersed geographically. The Department of Embryology was located in Baltimore in conjunction with the Johns Hopkins School of Medicine.

Here he worked until the age of 66 — taking the year 1952-53 to go to Oxford, having his retirement postponed a year so that he would have a full two years to wind up his work as a Research Director after the year in England.

While I only knew George Corner by reputation until he came to Philadelphia in 1960, he made a profound impression on me as I believe he did on everyone he worked with. He was first, last, and nearly all the time a worker, but this habit was relieved by a delightful yet kindly sense of humor. He had an extremely wide range of knowledge and was an engrossing conversationalist.

He was clearly endowed with great intelligence and great common sense. While always active he was not compulsive. He planned his work with amazingly good judgment and could and did stick to the timetable he had developed to accomplish a particular task. In this regard he was a perfect head of the staff of the American Philosophical Society. He moved in quite complex affairs steadily ahead. All significant contingencies seemed to be foreseen and provided for well in advance — yet he did this without any sudden or unreasonable demands on his staff. As in his research he was an innovator in his work with the Society, introducing a musical event to its programs each year, and streamlining the work of its office and of its numerous committees.

Never submerged by his diverse duties as chief of a staff of 30 or 40 persons, principal budget officer for an expenditure of between one and two million dollars a year, editor of its four serial publications, chairman of its program committee, and chairman of its research committee, he continued his independent scholarship in the history of science — polishing his wife's edition of the letters of Dr. John Fothergill, entitled *Chains of Friendship*, writing a life of Elisha Kent Kane, our first Arctic explorer, and finally in his last few years preparing his autobiography. While he died just a few weeks before this was published, he had corrected the proofs and personally prepared the index.

The foregoing memoir is only the skeleton, whereas *The Seven Ages of a Medical Scientist*, as he called his biography, adds the muscle, the viscera and all the rest in the integument of the beautiful prose of which he became such a master.

The closing sentences of his book, which were so feelingly read by his son at his memorial service, are a fitting quotation with which to close this memoir. They do in a way epitomize his optimism, his realism, and his practicality. He wrote:

I once had a correspondent who held that the universe is no good and should not exist. I disagree with him. I think highly of the universe. The buffets it gives us, we must take as they come; the benefits we can often help to arrange. I am proud to have been a member of the universe these ninety years past. One accepts, of course, the regulations for enrollment, pays his annual assessment of hard work, and aims to be a useful citizen of the local galaxy. In return, he receives the friendship of other members and the love of those who are near and dear to him.

University Hospital
University of Pennsylvania
3400 Spruce Street
Philadelphia, PA 19104

Memoir of William F. Kellow, M.D. 1922-1981

JOSEPH S. GONNELLA, M.D.

WILLIAM F. Kellow, M.D. died December 3, 1981 at his home after a long illness. He was 59 years old and lived in Wynnewood, Pennsylvania. One of the nation's foremost medical educators, Dr. Kellow was Dean and Vice President of Thomas Jefferson Medical College from 1967 until November 16, 1981 when he retired. During his brilliant academic administrative career, he served in several key positions in medical education. In 1979 he was elected to the American Medical Association's 11-member Council on Medical Education, responsible for recommending policies on all phases of medical education. He was also a member of the Liaison Committee on Medical Education, the accrediting body for United States and Canadian medical schools, and the American Medical Association's Advisory Committee on Undergraduate Medical Education. He served as chairman of that committee from 1977-80.

A native of Geneva, New York, Dr. Kellow graduated from the University of Notre Dame. He received his M.D. degree from Georgetown School of Medicine in 1946, interned at the District of Columbia General Hospital, and was a resident at Georgetown Hospital and the District of Columbia General Hospital. He completed a chief residency in medicine and pulmonary medicine. Certified by the American Board of Internal Medicine and the American Board of Pulmonary Diseases, Dr. Kellow served in the U.S. Air Force Medical Corps from 1951 until 1953.

During his professional career, Dr. Kellow was a member of the faculties of Georgetown School of Medicine, the University of Illinois College of Medicine, Hahnemann Medical College, and Jefferson Medical College. He was a respected clinician, investigator, and teacher. Bedside rounds with Dr. Kellow were an intellectual exercise which the medical students and house staff attended eagerly. He was able to teach the science as well as the art of medicine. Dr. Kellow impressed all with his knowledge, clinical judgment, empathy, and above all modesty. He was a model for the medical staff: that of the physician as a scientist and humanitarian. As an Associate Dean at Illinois, he played a vital role in many of the educational innovations that the school introduced in the late fifties and early sixties. He was instrumental also in establishing one of the first Offices of Medical Education in this country.

In 1961 he became Dean of Hahnemann Medical College and served in that capacity for six years before assuming the Deanship of Jefferson Medical College. As a manager Dr. Kellow had few equals. He was dean for twenty years. He managed two medical schools during some of the most difficult times faced by medical education. During his tenure as dean in Philadelphia, he introduced new medical programs, advocated a democratic process for the faculty and students, searched for a balance between education and research, and successfully received financial support to upgrade the basic and clinical facilities of the two institutions. During his years as a dean he had many crises, but he always faced them with logic and integrity. As a result, the crises were converted into progress and both institutions benefited from his leadership. Because of his impartial and logical approach to management, Dr. Kellow earned intense loyalty among his staff who not only admired him but were grateful for the way he made them grow in their own fields. He was able to delegate and yet monitor the work, so that goals were met on time and decisions were made through the use of objective data.

When asked to reflect on his major accomplishments shortly after he stepped down from the Dean's post, Dr. Kellow said that he took pride in the college's effort in encouraging more students to practice family medicine, especially in rural areas of Pennsylvania where practitioners of general medicine had been declining in number. Dr. Kellow helped restructure the curriculum to include emphasis on family medicine and in 1973 the college established what was then the only separate department of family medicine in Pennsylvania. The study of family medicine became a required course for third-year medical students.

Through his efforts, Jefferson's Physician Shortage Area Program was subsequently established, and in 1978 the college began a cooperative program with Indiana University of Pennsylvania to encourage students to enter general medicine in underserved rural areas.

Dr. Kellow received numerous awards, including honorary degrees from Hahnemann Medical College of Philadelphia, Georgetown School of Medicine, and St. Joseph's University in Philadelphia. He received the Centennial of Science Award of Notre Dame University in 1965. In 1978 the Jefferson Medical College Alumni Association commissioned his portrait, which was presented to Thomas Jefferson University. A similar honor had been given him by Hahnemann Medical College. Dr. Kellow was a member of the Board of Regents, American College of Physicians and served as Treasurer from 1970 to 1976. In 1977 he was presented the award of Mastership in the American College of Physicians, the highest honor presented to Fellows of that College.

Upon retiring from the Deanship of Jefferson Medical College, Dr. Kellow was given other honors. The Board of Trustees of the University named him Professor of Medicine and Dean Emeritus. He became the first recipient of the Winged Ox of Saint Luke Award presented for distinguished service to the University. He also received the Jefferson Medical College Alumni Achievement Award, which recognized graduates whose careers have brought honor and prestige to the medical school. Dr. Kellow was an honorary member of the association. In further tribute the University designated a recently completed suite of rooms in the medical college building as the Kellow Conference Center. Each room is named in honor of a Jefferson physician who has made an outstanding contribution to medical education.

Dr. Kellow is survived by his wife, the former Stella Toczylowski, by his daughters, Suzanne Kellow Portfolio, Joanne Kellow Rakov, Jennifer, Mary Jeanne, and Kathleen Kellow, and by his mother, Mrs. Robert Kellow of Geneva, New York. His death has created a great void among his family, friends, and in the medical education world. We shall miss him.

Jefferson Medical College
1025 Walnut Street
Philadelphia, PA 19107

Nicholas P. Christy, "Medical Language: An Exclusive Code," *Transactions & Studies*, Series V, Vol. III, No. 4 (December 1981). On page 310, second paragraph, thirteenth line from the bottom of the page, insert the following text:

Divine Presence: "that we may learn to bear the beams of love." Raw language, pure thought are too intense for us at our present stage of evolution . . .

Centennial Memoir of James Aitken Meigs, M.D.*

FREDERICK B. WAGNER, JR.

JAMES Aitken Meigs was a physician of humble birth who, in a life suddenly cut short in its fifty-first year, contributed much to medicine — the grandest science, the noblest art, and the most dignified labor known to man. A detailed account of his career appeared in W. B. Atkinson's book, *Physicians and Surgeons of the United States*,[1] published in 1878, one year before Meigs' unexpected death. Elaborate memoirs were published by the College of Physicians,[2] the Pennsylvania State Medical Society,[3] and the American Medical Association.[4] In May, 1951, Dr. Louis H. Clerf[5] delivered a scholarly address on Meigs, "Our Patron Saint," before the Meigs Medical Association. Sketches of Meigs' life are presented regularly at the monthly meetings of this society, founded in 1880, and second in age only to the Sydenham Coterie (1879). With the passage of one hundred years since his death and the founding of the Association named in his honor, another review is in order.

Meigs was of mixed English, Scotch, and German descent. A strong believer in the influence of heredity on temperament, he might have attributed his thriftiness to the Scottish background of his parents, and his disciplined habits to a German element in his mother's ancestry.

Meigs was born in Philadelphia on July 31, 1829. His parents were native Philadelphians. His mother, née Aitken, was the daughter of a silversmith who provided $500 for footgear for Washington's troops as they passed through the city on the way to Valley Forge. It was stated that Aitken, as an ingenious mechanic, covered the first United States ship with copper.

James was the only survivor of his parents' four children, two having died in infancy and a third at the age of ten. His attachment to his parents was strong — to his mother in early life and to his father in later life after his mother's death. The relation was enhanced by his bachelorhood. His mother gave him his early education before sending him to private school. He was thoroughly indoctrinated in the Episcopal faith and attended Christ Church regularly. He regarded his mother as almost a saint, and credited her with whatever talent he had throughout his life. Her death, which occurred when he was a practicing physician, left him greatly bereaved but only strengthened his ties with his father,

*Revision of speech presented before the Meigs Medical Association, Academy of Natural Sciences, Philadelphia, April 17, 1980.

who would often ride with him in the same horse and buggy to house calls and would attend his son's lectures at Jefferson Medical College. The father outlived his eminent son by more than fifteen years and, at the age of ninety-six, was honored during the fifteenth anniversary of the Meigs Association.

Dr. L. H. Clerf[5] mentions an early injury in which Meigs' thumb was blown off by an explosion of gunpowder. Fortunately the hand was saved and Meigs was able to give physiological demonstrations in which he would vivisect frogs, rabbits, or dogs. In the portrait of Meigs (Fig. 1), painted by G. W. Pettit in 1879 and commissioned by the Jefferson class of 1880, the hands are not shown. This portrait now hangs in the staff room of the new Thomas Jefferson University Hospital, facing that of Dr. George J. Willauer, a former president of the Meigs Association.

The young Meigs was a serious student and, indeed, a bookworm. In 1848 he was valedictorian of his class at Central High School. His address, ambitiously titled "The Destination of Philosophy," was couched partly in verse and revealed a poetic inclination that was to persist during Meigs' entire life. On March 12 in the year of his death, he delivered before the fifty-fourth graduating class of Jefferson Medical College a valedictory address written entirely in iambic pentameter.[6] This composition of 534 lines challenged the students to cultivate the science and the art of medicine, to struggle tirelessly against disease, to show compassion towards patients, and to strive both for personal success and for elevation of the profession. The opening lines mark the flavor and quality of this composition:

> Three times hath the golden summer come and fled.
> Three times hath pallid winter overspread
> With snow, and stamped with jagged seal of ice
> The shrinking earth; and rosy spring hath thrice
> In turn, with balmy breath, that seal dissolved
> Since you to learn the Healing Art resolved.

The advice given to the students of that era would serve well today.

> Shun braggart glory, crave no sounding name,
> Good deeds in heaven's scale weigh more than fame.
> All pomp and vain display avoid, although
> The foolish world is led by empty show.
> Be always what you seem, seem what you be;
> With learning couple large integrity.
> Through merit seek to rise, and not by dint
> Of blazoning your name in public print,

Or pseudo-scientific pamphlets which
Not science, but their writers seek to enrich
Through wondrous tales of cures adroitly told,
To snare the credulous and filch their gold.
Praise not yourselves, nor others' praises buy,
As men, not showmen, with each other vie.
Upon the public never seek to palm,
With face unblushing and without a qualm,
The coin of base presumptuous pretence
For sterling gold of honest excellence.

The final lines express adoration of the medical profession.

Behold how fair thou art, behold how fair,
Thy voice how sweet thy face beyond compare
How fair thy love, how better far than wine,
As honeycombs how drop thy lips divine;
How smell thy garments like to Lebanon,
Thou pleasant dove, thou fair to look upon,
Thou garden closed of spices sweet, thou well
Of living waters cool, thou soft gazelle.
How beautiful thy feet within thy shoes,
How cunning are wrought, thy joints and thews.
Thy neck is a tower of ivory,
Thou art all fair, there is no spot in thee.

Not even the legendary John Chalmers DaCosta, first Samuel D. Gross Professor of Surgery at Jefferson Medical College, whose poems were published by Dr. Fredrick E. Keller,[7] could surpass the beauty and eloquence of Meigs' language. It is not surprising that Meigs' collection of books included the most acclaimed poetry of ancient and modern times.

Endowed with a capacious memory, inquisitiveness, and philosophical inclinations, Meigs was attracted to a career linking the natural sciences with the study and treatment of emotional and physical illnesses. Encouraged by Dr. Charles DeLucena Meigs (not a kinsman), he took a six months' preceptorship in medicine with Drs. Francis G. Smith and Joshua M. Allen, supplementing this with a course of lectures on various medical subjects in the Philadelphia School of Anatomy. Later in the same year he matriculated at the Jefferson Medical College. Always wanting to do more than was required, he took notes of the lectures and debates of the Philadelphia County Medical Society, gave clinical reports of cases treated at Jefferson Medical College and Pennsylvania Hospital, and presented papers on the mortuary statistics of Philadelphia which were published in the *Medical Examiner*. This

Figure 1. Portrait of James Aitken Meigs, M.D. (1829-1879), by G.W. Pettit, painted in 1879.

activity continued even for some time after Meigs' graduation and resulted in beneficial professional contacts and warm friendships. Indeed, Meigs' pre-graduation relations with the Philadelphia County Medical Society led to his joining the Society upon receiving his degree. for many years he served as its corresponding secretary. In 1867 he was vice president and in 1871 he was president.

In March 1851 he received the degree of Doctor of Medicine from Jefferson Medical College. His graduation thesis, "The Hygiene and Therapeutics of Temperament," revealed his special interest in physiology. At this time he passed the examination given by the lecturers of the Philadelphia Association for Medical Instruction and was awarded a certificate.

Meigs started practice in Philadelphia at 1513 Lombard Street. Later he removed to 423 South Broad Street and finally to 1408 Spruce

Street. Driven both by economic and by academic ambitions, he started an active practice, yet found time to study at the College of Physicians and the Academy of Natural Sciences.

In April, 1852, at the early age of twenty-two years, Meigs was elected a member of the Academy of Natural Sciences. Two years later he was elected a member of the Academy's Standing Committee on Ethnology. In 1856 he was chosen Librarian and served in this position for several years, until his private practice became too demanding. In 1857 he became Chairman in Anthropology, holding this office until the Committee was abolished nineteen years later, three years before his death. His sustained interest in the Academy is evidenced by his delivery of a scholarly address when the cornerstone of the new building at Nineteenth Street and the Parkway was emplaced in October, 1872.

Meigs' self-training in close observation, careful comparison, and cautious deduction, all carried out in the dusty rooms and narrow aisles of the old Academy, undoubtedly formed the basis for his subsequent investigations. He systematically catalogued the Academy collection of human crania, which contained more than one thousand specimens. This extensive assemblage, now on long-term loan to the Museum of the University of Pennsylvania, is not to be confused with the crania displayed in the Mütter Museum of the College of Physicians.

Meigs' essay, "Cranial Characteristics of the Races of Man," portrayed human skulls in their ethnic relation.[8] Other publications included *Hints to Craniographers, upon the Importance and Feasibility of Establishing some Uniform System by which the Collection and Promulgation of Craniological Statistics and the Exchange of Duplicate Crania May Be Promoted* (Philadelphia: Merrihew, 1858); *Description of a Deformed, Fragmentary Human Skull, Found in an Ancient Quarry-Cave at Jerusalem; with an Attempt to Determine, by Its Configuration Alone, the Ethnical Type to which It Belongs* (Philadelphia: Merrihew, 1859; repr. from *Proceedings of the Academy of Natural Sciences, Philadelphia*); *Observations upon the Form of the Occiput in the Various Races of Men* (Philadelphia, 1860; repr. from *Proc. Acad. Nat. Sci. Phil.*); "On the Mensuration of the Human-Skull"(*North American Medico-Chirurgical Review* 5 [1861]: 837-61); and *Observations upon the Cranial Forms of the American Aborigines, Based upon Specimens Contained in the Collection of the Academy of Natural Sciences of Philadelphia* (Philadelphia, 1866; repr. from *Proc. Acad. Nat. Sci. Phil.*). The aforementioned monumental catalogue of skulls was his *Catalogue of Human Crania, in the Collection of the Academy of Natural Sciences of Philadelphia; Based upon the 3rd ed. of Dr. Morton's "Catalogue of Skulls," &c.* (Philadelphia, 1857).

In September, 1854, only three years after graduation from Jefferson, Meigs was appointed Professor of Climatology and Physiology in the

Franklin Institute, a position which he held for eight years. He was often required to deliver lectures on ethnological and other related subjects in natural science in various institutes of Philadelphia and vicinity. In that year he contributed to the *Journal of the Franklin Institute* (April 1854) an article on the physiology of stuttering and its treatment by mechanical means, "On the Physiology of the Voice, with Remarks upon Instruments for the Cure of Stammering." These activities illustrate the breadth of view that was to qualify Meigs for an academic chair in the institutes of medicine at the Philadelphia College of Medicine.

In 1856 Meigs assisted in the production of the first American edition of William Benjamin Carpenter's *The Microscope: and Its Revelations*, edited by Francis Gurney Smith (Philadelphia: Blanchard and Lea, 1865). Meigs' own microscope, the finest then available, was a handsome binocular model and was accompanied by an impressive set of accessories. Meigs' father eventually bequeathed the equipment to the Academy of Natural Sciences, where it is preserved among Meigs' memorabilia.[9]

In 1857, at the age of twenty-eight, Meigs was elected to the chair of the institutes of medicine in the Philadelphia College of Medicine. Two years later he succeeded his former preceptor, Dr. Francis G. Smith, in the chair of physiology in the Medical Department of the Pennsylvania College, with which the other school had been merged. The latter college had been founded by Dr. George McClellan, also a founder of Jefferson Medical College, but became defunct by attrition in 1861 when many of its southern students returned home at the outbreak of the Civil War. From 1857 until 1866 Meigs was busy with private practice and hospital duties.

In 1866 he was engaged as a lecturer in physiology for the Jefferson summer course. In 1869, at the age of thirty-nine, he was appointed to the chair of the institutes of medicine and jurisprudence, which had acquired prestige by the long and distinguished service of Professor Robley Dunglison, physician to Thomas Jefferson; Dr. Silas Weir Mitchell, the famous neurologist and novelist, was a rival candidate for the position. Unsolicited letters supporting Meigs' candidacy poured in from the medical profession of Philadelphia and from scientists throughout the world. The latter included Professor Joseph Henry of the Smithsonian Institution, Dr. Josiah Clark Nott, a noted ethnologist from Alabama, a Professor Wilson from Toronto, Professor Richard Owen of the British Museum, Professor William Turner of the University of Edinburgh, Dr. Paul Broca of the Academy of Medicine in Paris, and the scholars Von Duben of Stockholm and Pruner Bey of Cairo. Meigs held memberships in a host of international scientific societies and

Figure 2. Photograph of participants at the Centennial Anniversary of the Meigs Medical Association, April 17, 1980, at the Academy of Natural Sciences of Philadelphia.

collected at least 800 books on natural science and physiology. By the age of thirty-nine he had attained eminence but was fated to live only eleven years more.

As an introduction to his course on physiology at Jefferson Medical College Meigs gave a dissertation titled *The Correlation of the Physical and Vital Forces* (Philadelphia: Medical and Surgical Reporter, 1868). He was among the first to illustrate his lectures by means of the stereopticon. His presentations were prepared thoroughly and were delivered without notes. His colleague, Dr. Samuel D. Gross,[10] stated that if Meigs did indeed have a fault, it was that his lectures were prepared in too great detail, and often contained more than the students could assimilate. He had difficulty in condensing his information to conform with the time allotted for the designated lecture or for the course. Nevertheless, Meigs was a favorite of the students and until the few days preceding his death was never known to miss a lecture on account of illness.

The details of Meigs' death on November 9, 1879, remain obscure. The seriousness of his illness was not appreciated initially. He died at

home, without medical records. No postmortem examination was ever performed. Meigs became indisposed with chills and fever, and his absence from class for the first few days caused no alarm. The illness, however, persisted for nearly a week. The physician in attendance was Dr. John Hill Brinton, who had distinguished himself during the Civil War as an administrator and pathologist, had served as physician to General Grant, and was later to share the divided Chair of Surgery upon the death of Samuel D. Gross in 1884. Brinton called as consultant Professor Jacob Mendez DaCosta, a colleague at Jefferson and one of Philadelphia's most noted physicians. The case was called one of "blood poisoning." Meigs became jaundiced, and his liver was said to be in "torpid condition." He seemed to rally, but suddenly became cyanotic and died fifteen minutes later. This terminal event was thought to be pulmonary embolism.

Meigs' death, a serious loss to Jefferson, was felt equally by faculty colleagues and students. He was succeeded by Dr. Henry C. Chapman, the grandson of Nathaniel Chapman. On April 20, 1880, eight recent graduates of Jefferson, who had been his pupils, perpetuated his memory by founding the Meigs Medical Association, which is still active in its Centennial year (Fig. 2).

Jefferson Medical College
Thomas Jefferson University
Philadelphia, PA 19107

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9. A microscope of similar type is depicted by Thomas Eakins on the portrait of Benjamin Howard Rand, Professor of Chemistry at Jefferson Medical College, who was the only person of the faculty younger than Meigs. This portrait is on display in the Eakins Gallery of Jefferson Alumni Hall.

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Analytical Psychology for the Family Physician*

FRED B. ROGERS

FROM my years in medical school at Temple University during the nineteen forties, I do not recall hearing anything about analytical psychology or about Carl Jung, its founder. The Department of Psychiatry then was thoroughly Freudian, and I suspect that Jung was unmentioned partly because he had rejected the dogma of psychoanalysis formulated by Sigmund Freud. However, Jung's courage in this apostasy and his role in American thought gradually became apparent to me.

In *The Health of the Mind* (1951), Dr. J. R. Rees wrote:

> C. G. Jung, of Zurich, who worked for a time with Freud, broke away from him and started a school of *analytical psychology* of his own. His theory tends to be much more philosophic than that of Freud. There is less determinism, and consequently less emphasis on reductive analysis, that is, a process of analysis which aims at tracing every tendency backward to its source. Jung is more concerned with the present-day psychology of his patients, and is not afraid to help them by teaching or other methods.[1]

The Collected Works of C. G. Jung, published by Princeton University Press, and participant membership in the C. G. Jung Foundation for Analytical Psychology in New York City taught me more about this Swiss sage and his circle. Moreover, Jung's concepts appear often in literature about art, philosophy, religion, and the stages of life. Today, Temple's Department of Psychiatry acknowledges the fabulous content of the mind; this theme preoccupies the Jungian group.

In his book *Inner Companions*, Colman McCarthy, the columnist, noted the current popularity of Jung's writings:

> Carl Gustav Jung is perhaps the best read and even the most understood in the competition among himself, Freud and Adler. Jung paperbacks are everywhere, thanks to book companies who know the sales value of the drugstore rack. . . . Far from watering down the mysteries of the unconscious, Jung risked drenching the reader with them, knowing that every person is a test-case for psychic experiences. Stand aside from life for a moment, he says, and trust rather than fear the conscious conflicts within you.[2]

*Read at Temple University School of Medicine, January 12, 1981.

Aside from general culture, of what value is knowledge of Jungian thought and therapy to a family physician? It is valuable chiefly because it enhances his understanding of human personality and its deviations, and because it helps promote psychic harmony between the inner self and the outer world. Analytical psychology employs clinical data, empirical experience, and metapsychological concepts such as "persona," "anima and animus," and "archetypes " to delineate and integrate mental processes. Attention is directed to such matters as parental images, cultural symbols, and the like, and to the relation between such spiritual areas as religion and mythology.[3]

Jung developed the concept of introvert and extrovert dimensions of personality. Further distinctions of mental function, he asserted, depend on primacy in the individual of either thinking, feeling, sensation, or intuition. His book, *Psychological Types* (1921), provides the basic text for analytical psychology. Here, as Dr. Henri F. Ellenberger noted, Jung "offered a full-fledged new system of dynamic psychiatry."[4]

Several Jungian terms must now be defined. In analytical psychology the term "persona" (mask) denotes the role which a person assumes in his daily living as distinguished from his inner character. The mask is a compromise formed in the interests of social conformity. "Anima and animus" label the contrasexual portion of the psyche: the femininity in men and the masculinity in women. In his scrutiny of complex emotional qualities, Jung employed the Greek word *enantiodromia* to identify the regulative function of opposites. "Archetypes," the original patterns or models of thinking, are mental images met in what Jung called the "collective unconscious."

Several tests based on Jung's *Psychological Types* have been developed to estimate the personality profile of an individual. The Gray-Wheelwrights Test, a Jungian type survey first formulated in 1944, consists of eighty-two questions which can be answered in twenty minutes or less on rapid-score sheets. Easily self-scored by reference to an accompanying manual, this questionnaire is useful for assessing the subject's habitual method of dealing with many daily situations. It also indicates the extent of introversion-extroversion, sensation as contrasted with intuition, and thinking as compared with feeling. These parameters reflect possible behavior and adaptation processes in patients. Information of this kind can also be helpful in the area of marriage relationship, since many vexed marital situations revolve around type-problems which hinder communication. The test was devised by Drs. Horace Gray and Joseph B. Wheelwright, psychiatrists and pupils of Jung, and Jane H. Wheelwright. The scoring manual is based upon articles

written by Drs. Gray and Wheelwright; supplementary assistance was given by Elizabeth W. Buehler and Dr. John A. Buehler. Copies of the Gray-Wheelwrights test are obtainable from the C. G. Jung centers in San Francisco and New York City.

Another test which is useful for assessment of personality is the Myers-Briggs Type Indicator (MBTI). The test, based on Jungian principles, was devised in 1943 by Isabel B. Myers and Katharine C. Briggs, two psychologists. Subsequently modified by the Educational Testing Service of Princeton, New Jersey, it now consists of 166 multiple-choice questions applicable to students in grades 9-16 and to adults. It is answered in fifty to fifty-five minutes. Complete tests are scored by reference to a handbook. The inventory aims to show which sides of one's personality have developed the most. Most people are in an ambivert category, having characteristics of both extraverts and introverts.

The shorter Gray-Wheelwrights Test and the longer Myers-Briggs Test are helpful in examining patients and in teaching medical students and residents in family practice. Two monographs and two articles stemming from the MBTI are recommended. The monographs, compiled by Mary H. McCaulley, are *Application of the Myers-Briggs Type Indicator to Medicine and Other Health Professions* (1978) and *The Myers Longitudinal Medical Study* (1977). The former discusses the state-of-the-art of the MBTI in health careers, and presents evidence of its reliability and validity. The latter brings together data on Isabel Myers' longitudinal study of 5355 medical students tested in the 1950s and followed up to discover type-differences in academic achievement and in the choice of specialty. The articles are *Relation of Medical Students' Psychological Type to Their Specialties Twelve Years Later* (1964) by Isabel B. Myers, and *How Individual Differences Affect Health Care Teams* (1975) by Mary H. McCaulley. The second article is a preliminary report on predicting behavior of faculty health teams.*

Many problems of behavior and mental health are seen by the family physician. He must be familiar with various modes of treatment and must be able to select appropriate consultants by understanding their regimens. In most cases treatment seizes upon the observable symptoms and aims to relieve the patient's inability to cope with daily life.

Jungian psychotherapy is eclectic in scope. Jung attached less importance than Freud to sexual instinct as a motivating force and

*These research publications and other related workshop materials can be obtained from the Center for Applications of Psychological Type, Inc., 1441 NW. 6th St., Gainesville, FL 32601.

believed that the true objective of a psychoanalyst is to direct his patient toward lofty ideals.[5] Treatment usually takes place in four continuous stages: discussion, amplification, education, and transformation.[6] It is supportive and transcendent. Prof. David Elkind of Tufts University has written:

> Jung's followers have tried to maintain his open approach to psychotherapy. In their training institutes, Jungian therapists expose their students to the whole gamut of psychotherapeutic procedures. Likewise, in their practice, Jungian therapists employ whatever methods and techniques seem appropriate to the patient's problem.[7]

To be a good prospect for Jungian psychotherapy, a person should possess an adaptive capacity and flexibility of mind. Verbal facility and intelligence also are helpful for deriving insight through discussion. The ability to reflect and introspect is highly favorable in this process of self-renewal. Such counseling is chiefly beneficial for resolving anxiety, situational difficulties, and stress reactions.[8] Colman McCarthy notes:

> If one visit by a patient is enough for the patient, then let it be one visit — Why drag it out for years of analysis? ... The best of Jungian analysts stick to this method: a patient's spirit doesn't always need total rebuilding (at $25 or $50 a session), it may only need temporary relief.[9]

In this country, lists of analysts, courses and training programs for physicians and others are available at the C. G. Jung Foundation for Analytical Psychology of New York (28 E. 39th Street, New York, NY 10016), C. G. Jung Center of Chicago (550 Callan Ave., Evanston, IL 60202), C. G. Jung Institute of San Francisco (2040 Gough Street, San Francisco, CA 94109), C. G. Jung Institute of Los Angeles (10349 W. Pico Blvd., Los Angeles, CA 90064), and the Carl Jung Education Center (5200 Montrose Blvd., Houston, TX 77005). Overseas, the International Association for Analytical Psychology is located in Zurich, Switzerland (52 Weinbergstrasse, Zurich 8006), and the Society of Analytical Psychology in London, England (30 Devonshire Place, London W 1). Other countries where Jungian societies and therapists are found include Belgium, Canada, Denmark, France, Germany, Holland, India, Israel, Italy and South Africa.

The Jungian sphere of the collective unconscious, already mentioned, encompasses the total experience of the human race. The symbolism is shared by all in dreams. Jung said:

> The unconscious is not just evil by nature, it is also the source of the highest good: not only dark but also light, not only bestial, semihuman, and demonic but superhuman, spiritual, and, in the classical sense of the word, "divine."[10]

Jung's essay, "The Stages of Life," in his *Modern Man in Search of a Soul* (1933), reviews the seven ages of man in masterful fashion. Its author's rich insight into human character and conduct was revealed with gentleness and skill. The second half of life, Jung noted, has its own standards. It is more spiritual or "numinous." As a person shrinks physically with advancing age, he tends to expand spiritually. In this way one gradually prepares to depart this life for another realm. In some middle-aged persons, a lack of religious focus (in its broadest sense) makes for unhappiness and should be restored. Jung cited the need for spiritual or religious belief, especially in later life, to uplift each person and help combat the shadow or "forces of darkness." Both patient and doctor, he said, can benefit from some faith in a higher power.[11] Concerning life's trials, Jung quoted an adage of Erasmus: "Summoned or not, God will be there."

Carl G. Jung (photograph by Dmitri Kessel, 1949).

Dr. E. A. Bennet of the Institute of Psychiatry at London University has written as follows:

> C. G. Jung's contributions to psychology and psychiatry appeared in a fairly steady stream for nearly sixty years, that is from his first publication in 1902, till 1961, the year in which he died. He had an original mind and from the first his books attracted attention. Of special interest to him was the everyday adaptation of the individual to others . . . For Jung the symptoms of psychiatric illness were simply signs of disturbed normal functioning. Thus he was concerned more with the healthy than with the unhealthy elements in the personality . . . Jung saw his patient not as an isolated individual, but as an individual in the community . . . Jung's work is of special interest to students of medicine; also it has stimulated thought in sociology, theology and in general literature, because it contains the potentiality of growth in many directions.[12]

Temple University School of Medicine
3400 North Broad Street
Philadelphia, Pennsylvania 19140

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The *Preface* of Dioscorides' *Materia Medica*: Introduction, Translation, and Commentary

JOHN SCARBOROUGH and VIVIAN NUTTON

Introduction

ALTHOUGH Dioscorides' *Materia Medica* is one of the most influential of all medical writings, scant attention has been accorded it by modern classical scholars and medical historians.[1] In it, one reads of a welter of plants, oils, minerals, insects, animal products, and wines, all organized into a coherent handbook of pharmacy and pharmacology which retained its usefulness for over 1800 years. Only with the acceptance of Linnaean nomenclature did Dioscorides' manner of classification of herbs lose its influence,[2] and only with the rise of organic chemistry in the mid-nineteenth century did his data cease to be used in the everyday practice of herbalism, pharmaceutical manufacture, and dispensing.[3] Given the remarkable history of the *Materia Medica* in

1. There is ample literature on Arabic, Renaissance Latin, etc. use of Dioscorides, but there is little scholarly writing on Dioscorides *per se*. One must still turn to Max Wellmann, "Dioskurides" (12), *RE* 5, pt. 1 (Stuttgart, 1903), cols. 1131-42, for an overview of Dioscorides and his times and for the relations between the *Materia Medica* and other works on pharmacy and pharmacology. John M. Riddle, "Dioscorides," *DSB* (New York, 1971) 4: 119-23, is also excellent, although more compact, while Riddle's *Dioscorides* in F.E. Kranz and P.O. Kristeller, eds., *Catalogus Translationum et Commentariorum* (Washington, D.C., 1980) 4: 1-143, is a splendid summary, not only of Dioscorides' influence but also of the many redactions, translations, rearrangements, and "pseudo" Dioscoridean works, and relevant bibliography. As Riddle demonstrates, most scholarly work has concentrated on manuscript traditions, illuminations, and a broad category of studies that could be called 'the Renaissance Dioscorides.'

2. More accurately, both Theophrastus' *Historia Plantarum* and Dioscorides' *Materia Medica* remained influential in botanical nomenclature until the appearance of the *Species Plantarum*, first ed. by Linnaeus in 1753. See John L. Heller, "The Early History of Binomial Nomenclature," *Huntia* 1 (1964): 33-70, and John Scarborough, "Theophrastus on Herbals and Herbal Remedies," *Journal of the History of Biology* 11 (1978): 353-85.

3. Even with the work of Lavoisier, Wöhler, Berzelius, Liebig, and others in the late eighteenth and mid-nineteenth centuries, the ancient theories of drugs still held many followers. See Harold Hartley, *Studies in the History of Chemistry* (Oxford, 1971) 195-222

its numerous editions, translations, redactions, and emended and augmented texts,[4] it is surprising that no modern English translation exists,[5] and that Max Wellmann's Greek text of 1907-14 still stands as definitive[6] (even though Wellman was unaware of several important witnesses to the text[7]). Not only does Dioscorides provide an enormous number of details about Greek and Roman pharmacy in a century of rapid development and augmentation in substantive botany and drug lore,[8] he also gives much related information on ancient languages,[9]

[academic-social aspects]; W.A. Campbell, *The Chemical Industry* (London, 1971) 116-24 [practical implications for the mass production of drugs]; and J.R. Partington, *A Short History of Chemistry*, 3rd ed. (London, 1957) 216-38 [biographical sketches]. John Crellin, "Antibiosis in the Nineteenth Century," in J. Parascandola, ed., *Antibiotics: A Symposium* (Madison, Wisconsin, 1980) 5-14, suggests the firm connections between the 'new' chemistry and the 'new' germ theory, both of which contributed to the radical shift of medicine and pharmacy from their venerated classical models.

4. Riddle, *Dioscorides*, 6-15.

5. The commonly-cited R.T. Gunther, ed., *The Greek Herbal of Dioscorides . . . Englished by John Goodyer A.D. 1655* (Oxford, 1934; rptd. New York, 1959) reflects only the use of the printed Greek — or more likely the Latin translations — available to Goodyer in the seventeenth century, and there is no attempt to gain access to manuscripts in order to determine readings and witnesses. Goodyer's translation therefore suffers from a number of deficiencies, not the least of which is a crude quasi-transliteration of Greek plant names.

6. Max Wellmann, ed., *Pedanii Dioscuridis Anazarbei De materia medica*, 3 vols. (Berlin, 1907-14; rptd. 1958). Greek text only.

7. Professor John Riddle, who has recently visited many European libraries to examine Dioscorides MSS, writes, "The manuscript traditions are more complex than Wellmann knew about, but, of course, I've now seen two or three times more Greek manuscript texts than he saw. Nonetheless he captured the main lines except possibly one: there seems to be a second Greek alphabetical recension, one different from the Vienna MS 1, Naples MS 1, New York Pierpont Morgan, Mt. Athos Omega 75 line, which begins with *aeizon to mega*. This second group begins with *Abroton* and is more complete and with marginal drawings in distinction from the Vienna MS 1 group which, as you know, has the drawings between the texts sometimes on full folios" [letter to JS, 3 August, 1981].

8. This is particularly evident in Latin, e.g. Celsus, *De medicina*, esp. V and VI; Scribonius Largus' odd *Compositiones* (ed. G. Helmreich [Leipzig, 1887]); and, of course, in Pliny's *Natural History*, especially the data scattered throughout Books XXIII-XXXII (best ed. with comm. by J. André, A. Ernout, G. Serbat, and E. de Saint-Denis in the Budé series [Paris]). Clearly Greek authors and works were the basis of much of this Latin botany and pharmacy, and many of the authors mentioned by Dioscorides in the *Preface* also appear in Celsus' quotations and in the list of authorities provided by Pliny. Ernst

synonyms,[10] Far Eastern markets used by Ptolemaic Egyptians and Romans,[11] early history of Greek pharmacy,[12] and the great appeal of magic and superstition interwoven in ancient pharmacology.[13] Most

H.F. Meyer, *Geschichte der Botanik* (Königsberg, 1855; rptd. Amsterdam, 1965) 2: 4-153, still remains one of the best summaries, even allowing for the advances of modern scholarship. For many of the 'obscure' writers in Greek, see now Cajus Fabricius, *Galens Exzerpte aus älteren Pharmakologen* (Berlin, 1974).

9. Wellmann proposed that many of the "foreign names" of plants, inserted into the later recensions of the Greek text of Dioscorides' *Materia Medica*, came from a plant glossary compiled by Pamphilus of Alexandria (fl. c. A.D. 130); see his "Die Pflanzennamen des Dioskurides," *Hermes* 33 (1898): 360-422 [370-73]. Wellmann, ed., Dioscorides 3: 327-58 ("Nomina plantarum Ps. Dioscuridea e Pamphilo hausta") provides a separate index for these interpolated names, and even though they are not given by Dioscorides himself, many are derived from the same century by Pamphilus. Galen, however, in his *Mixtures and Properties of Simples*, VI, preface (ed. Kühn, XI, 789-98), condemns Pamphilus, accusing him of fabrication and of naming plants never seen (esp. Kühn, XI, 792, 793, 796, 798) — contrast *Compound Drugs Arranged by Location of Ailment*, V, 2 (ed. Kühn, XIII, 842-43) where Galen quotes a prescription by Pamphilus with apparent approval. Pamphilus' additions to Dioscorides had a wide circulation. Together with Dioscorides' original names, this collection of interpolations provides fascinating glimpses for the philologist interested in Egyptian, "Dacian," Gallic, etc. names.

10. In addition to the interpolations by Pamphilus, comparison with other Greek authors on botany and pharmacology yields an intriguing catalogue. See esp. M. Wellmann, "Pamphilos," *Hermes* 51 (1916): 1-64, and H. Stadler, "Theophrast und Dioscorides," in *Abhandlungen aus dem Gebiet der klassischen Altertums-Wissenschaft. Wilhelm von Christ zum sechzigsten Geburtstag dargebracht von seinen Schülern* (Munich, 1891) 176-87; Wellmann, "Pflanzennamen," *Hermes* 33 (1898): 360-422 [passim]; and John Scarborough, "Theophrastus on Herbals and Herbal Remedies," *Journal of the History of Biology* 11 (1978): 353-85, and "Nicander's Toxicology, II: Spiders, Scorpions, Insects and Myriapods," *Pharmacy in History* 21 (1979): 3-34 [7, 13, and 20, with nn. 54, 142, and 214], and 73-92 [passim].

11. E.g. the Aloe of Socotra (*Aloe perryi* Baker) in Dioscorides, III, 22. 1-5 (ed. Wellmann, 2: 28-30), compared with Celsus' single mention (*De medicina*, I, 3. 25-26); this can help date the full exploitation of the monsoon patterns to and from India. Unfortunately, J. Innes Miller, *The Spice Trade of the Roman Empire* (Oxford, 1969) seems to employ the Goodyer-Gunther Dioscorides, with a number of resulting errors in terms of what 'Dioscorides says.' For the eastern spice and medicinal trade, a better account is in E.H. Warmington, *The Commerce Between the Roman Empire and India*, 2nd ed. (London, 1974) 180-234. See also commentary to *Preface* 3 below.

12. Dioscorides' list of the names of his predecessors in the *Preface* is a precious document in its own right. See commentary below.

13. Wellmann, "Pflanzennnamen," *Hermes* 33 (1898): 371-76, and "Pamphilos," *Hermes* 51 (1916): 57-58.

important, Dioscorides attempts a rational methodology in pharmacology; he says that he will employ a new approach to medical botany — the classification of herbs according to the properties of medicinals derived from them (*Preface*, 5, below).

The *Preface* to the *Materia Medica* is interesting and important in its own right. Here Dioscorides tells the reader why he considers *his* attempt better than all its predecessors. He writes that he has taken special care to observe many plants as they emerged, flowered, and matured, and as they aged and withered. He also admonishes his readers explicitly that the mass of details must be continually supplemented by "... extending ... the range of preparations and mixtures and ... trials on patients, for the knowledge of each individual drug has a great deal to contribute" (*Preface*, 5).

The numerous redactions of the *Materia Medica* that occurred in the centuries following its composition were, in some respects, results of the author's dictum that what was contained in its five books was only a part of the larger whole of pharmacy and pharmacology. Unfortunately, many later compilers ignored Dioscorides' condemnation of alphabetical drug lists (*Preface*, 3, below): both Oribasius[14] and the famous Vienna Manuscript of Dioscorides (A.D. 512),[15] provide listings of plants and medicinal substances alphabetically, precisely in the manner that Dioscorides thought unwise. Later pharmacologists, however, did pay attention to the stricture against simply replicating Dioscorides' work in any rearrangement whatever. Galen, who praised Dioscorides highly, proudly wrote of his own botanical expeditions and of his journeys conducted for the acquisition of reliable supplies of mineral drugs.[16] Galen, moreover, used a number of varying pharmaceutical

14. Oribasius, *Medical Collection*, XI-XIII (J. Raeder, ed., *Oribasii Collectionum medicarum reliquiae* [Leipzig, 1928-33; 4 vols.] 2: 80-180). H.O. Schröder, "Oreibasios," *RE*, Supplementband 7 (Stuttgart, 1940), cols. 797-812. Barry Baldwin, "The Career of Oribasius," *Acta Classica* 18 (1975): 85-97. Herbert Hunger, *Die hochsprachliche profane Literatur der Byzantiner* (Munich, 1978; 2 vols.) 2: 293-94. Heinrich Haeser, *Lehrbuch der Geschichte der Medicin und der epidemischen Krankheiten*, 3rd ed. (Jena, 1875; 3 vols.; rptd. Hildesheim, 1971) 1: 452-55.

15. Vienna, Österreichische Nationalbibliothek MS Gr. 1.

16. E.g. Galen, *Mixtures and Properties of Simples*, IX, 2 and 4 (ed. Kühn, XII, 168-78, 178-92): Galen's journeys in search of the best Lemnian and Samian Earths. Partial trans. of *Simples*, IX, 2, by Arthur John Brock, *Greek Medicine* (London, 1929; rptd. New York, 1977) 191-95. See also M. Berthelot, "Sur les voyages de Galien et de Zosime dans l'Archipel et en Asie, et sur la matière médicale dans l'antiquité," *Journal des Savants*, ser. 3, 60 (1895): 382-87.

authorities in his *Properties and Mixtures of Simples, Compound Drugs Arranged by Location of Ailment, Compound Drugs Arranged by Kind,* and *Antidotes.*[17] Although these books are chaotic and inconsistent, because Galen leaves unharmonized the differing opinions of the many quoted sources, he — like Dioscorides — was attempting to reduce a great mass of material to manageable size by a precise system of classification which would identify and name the plants and drugs beyond doubt. Yet Galen discarded Dioscorides' remarkably perceptive system of drug affinities, quite similar to the underlying assumptions of modern pharmacognosy. In the *Materia Medica*, Dioscorides classed simples in large groups: aromatics, oils, salves, trees and shrubs [liquids, gums, and fruits] (Book I); animals, parts of animals, animal products, cereals, pot herbs, and sharp herbs (Book II); roots, juices, herbs, and seeds (Book III); roots and herbs (Book IV); and wines and minerals (Book V). Like many other later ancient and medieval pharmacologists, Galen may have perceived this "ordering" in the *Materia Medica* as simply slapdash data-gathering, and thereby devised his own "better" systems, as suggested by the titles of his drug books. Modern pharmacognosy, however, has begun to confirm Dioscorides' pharmacological observations. One may note that the *Materia Medica* does not group simples by botanical structure (or by any other known system of ancient classification of drugs), but by an apparently acute attention to "what happened" when certain drugs were administered. This method, of course, demanded careful and precise linkage of specific drugs with specific plants and medicinals, as well as extremely accurate records of patients' reactions to particular drugs.

Neither Dioscorides nor Galen succeeded in convincing his successors to follow his rules. Medical writers emulated the precedents of the Hippocratic authors and appended lists of suggested drugs and herbs after their discussion of particular ailments. Paul of Aegina, a late Byzantine compiler, adopted this approach in most of his medical encyclopedia, with the significant exception of Book VII, which is devoted solely to drugs arranged alphabetically.[18]

All extant ancient writers on pharmacology after the Hippocratics took for granted the role of *dynameis*, translated below as "properties" rather than "powers," to ensure a specific understanding of how Greek

17. Fabricius, *Pharmakologen*, passim.

18. Paul of Aegina, VII, 3 (I.L. Heiberg, ed., *Paulus Aegineta* [Leipzig, 1921-24; 2 vols.] 2: 186-275): generally from Dioscorides and Galen.

and Roman physicians and pharmacists applied the general notion of *dynameis* to *pharmaka*.[19] Properties, *per se*, promoted "drying," "moistening," "heating," and "cooling," in conjunction with other equally venerated notions of "elements" and "qualities," which determined such "properties" from assumed proportions of earth, air, fire, and water in the particular herb or medicinal.[20] And even though the theory of humors was also taken for granted by most medical writers of his day, Dioscorides does not give humors special importance in his *Materia Medica*: one reads that given drugs will expel phlegm, or bile,[21] but unlike Galen's drug theory,[22] the notion of *krasis* or balance among the four humors (blood, black and yellow bile, and phlegm) does not figure as significant in Dioscorides' *Materia Medica*. This may suggest that Dioscorides either had rejected the theory of humors, as did the Asclepiadeans, or that he was unaware of their importance in most contemporary medical theory (which is unlikely), or that he may have substituted the *dynameis* as the important aspect in his encompassing notion of how drugs worked.

Dioscorides himself is our only source of information about his life and work, and current knowledge of medicine and medical education in the eastern half of the Roman Empire in the first century A.D. does not permit firm conjectures about his background. If, however, he learned his medicine and pharmacology from an intellectual master — and his references to Arius imply that he regarded himself as equally cultured — there is a strong probability that Dioscorides studied at Tarsus. This was a city with a flourishing intellectual and cultural tradition, to which

19. Cf. Galen, *Mixtures and Properties of Simples*, I, 1 (ed. Kühn, XI, 379-81 [esp. 380]). To state the obvious, this is *not* a chemical notion of drug action.

20. Galen, *Mixtures and Properties of Simples*, I, 2-20 (ed. Kühn, XI, 382-416). John Scarborough, "The Galenic Question," *Sudhoffs Archiv* 65 (1981): 1-31 [13-14 with nn. 72-73].

21. E.g. among numerous examples, Dioscorides, IV, 162 (ed. Wellmann, 2: 306-09): white hellebore ". . . cleanses the bowels from above [viz. one takes it by mouth] of phlegm and bile . . ." (IV, 162. 2 [Wellmann, 2: 308]).

22. Well illustrated in *On the Natural Faculties*, I, 13 (ed. Kühn, II, 39-44 = ed. and trans. by Arthur John Brock, *Galen On the Natural Faculties* [London, 1916; Loeb] 60-71), and, in terms of 'practical application' in *On Prognosis*, II, 15-21 (ed. and trans. by Vivian Nutton, *Galen: On Prognosis* [Berlin, 1979] 78-81).

can be assigned several noted writers on pharmacology,[23] the earliest of whom was Philo,[24] the inventor of a famous antidote. Arius himself came from Tarsus,[25] and Galen's notice that Dioscorides also came from there, if this is not a simple error, may refer to his early education at Tarsus, for Galen knew well enough that Dioscorides came from Anazarbus.[26] If one identifies Lucius of Tarsus, cited by Andromachus the Younger, with Lucius the teacher of Criton and Asclepiades the Pharmacist,[27] the list of Tarsian notables in pharmacology can be extended down to the end of the first century A.D.[28] Clearly pharmacologists from Tarsus were famous authorities on drugs, and one finds Apollonius,[29] Magnus,[30] and Aristarchus[31] — all from Tarsus — cited by

23. W.M. Ramsay, *The Cities of St. Paul* (London, 1907) 228-35, and C.P. Jones, *The Roman World of Dio Chrysostom* (Cambridge, Mass., 1978) 71-82, give the background without mentioning medicine. The reference to the flashy medical lecturer by Dio Chrysostom, *Discourses*, XXXIII, 6 [*First Tarsian Oration*], is particularly apt for Tarsus.

24. Prob. fl. in the early decades of the first century A.D. The antidote was called *Philoneion*, and Galen, *Compound Drugs Arranged by Location of Ailment*, IX, 4 (ed. Kühn, XIII, 267-69) preserves the 'formula' which Philo had written down in a 26-line poem. Galen feels compelled to "explain" the medical poem of Philo, with a commentary that consumes 7½ pages of the Kühn text (XIII, 269-76). The *Philoneion* is mentioned elsewhere by Galen (e.g. *Therapeutics for Glaucon*, II, 8 [ed. Kühn, XI, 114]; *Compound Drugs by Location of Ailment*, VIII, 7 [ed. Kühn, XIII, 202]; and *Parts Affected*, II, 5 [ed. Kühn, VIII, 84]), and the formula is mentioned by several other writers, including Aretaeus of Cappadocia, *Treatments for Chronic Diseases*, II, 5. 4 (C. Hude, ed., *Aretaeus*, 2nd ed. [Berlin, 1958] 164), and by Celsus, *De medicina*, VI, 6. 3, if Philo the author of a collyrium is the same man. If we are to believe Aelius Aristides, *Sacred Tales*, V, 26-29 [= *Orationes*, XLIX, 26-29], in August, A.D. 148, he was instructed by the god Asclepius to quaff this antidote (C.A. Behr, *Aelius Aristides and the Sacred Tales* [Amsterdam, 1968] 247).

25. See commentary below to *Preface* 1.

26. See commentary below, *Anazarbus*.

27. F.E. Kind, "Lucius" (7), *RE*13, part 2 (Stuttgart, 1927), cols. 1652-1653. Andromachus in Galen, *Compound Drugs Arranged by Location of Ailment*, IX, 5 (ed. Kühn, XIII, 295).

28. Fabricius, *Pharmakologen*, 191.

29. Andromachus in Galen, *Compound Drugs Arranged by Kind*, V, 13 (ed. Kühn, XIII, 843). Fabricius, *Pharmakologen*, 227 with n. 49.

30. Asclepiades in Galen, *Compound Drugs Arranged by Location of Ailment*, IX, 7 (ed. Kühn, XIII, 313).

Andromachus, Criton, and Galen.[32] This Tarsian tradition is impressive, and far exceeds that recorded for any similar city in the Roman Empire. It is firmly preserved not only by Dioscorides but also by the brazen Galen, who transcribed many of the writings of Criton of Heraclea and Asclepiades the Pharmacist. Whether they studied with Lucius at Tarsus, or less probably in Rome, is uncertain, but they provide a plausible link between later Tarsian pharmacology and its encapsulation by Galen.

The *Preface* of Dioscorides' *Materia Medica* is the most difficult part of the entire tract: its Greek presents an awkward mixture of a specialized technical vocabulary and a flowery rhetorical style with occasional odd constructions. Once Dioscorides proceeds into the main body of his plants and drugs, his Greek becomes much more straightforward, blunt, and briskly descriptive. The two authors of the present essay have consulted and struggled with many phrases as they prepared their version, and still remain uncertain about some precise nuances. Their commentary will indicate the major difficulties of interpretation. Scholars who compare this translation with the German version of Berendes,[33]

31. Asclepiades in Galen, *Compound Drugs Arranged by Kind*, V, 11 (ed. Kühn, XIII, 824). Perhaps also ibid., VII, 5 (XIII, 104).

32. Aristarchus is mentioned by Criton in Galen, *Compound Drugs Arranged by Location of Ailment*, V, 1 (ed. Kühn, XII, 818), but without an ethnic, although the use of Cilician marjoram (prob. *Origanum vulgare* L.; or possibly *Majorana hortensis* Moench) suggests the identity. Dioscorides, III, 25 (ed. Wellmann, 2: 35-36) tells us that there are two kinds of *hyssopos*: one grows in Cilicia, and another kind grows in gardens. Although LSJ, 9th ed., *s.v.* (p. 1905) give "hyssop" as the translation, the basic clue to the identity of the plant is in the drawing of Dioscorides' *hyssopos* in the Vienna MS Gr. 1, fol. 358^{v}, which resembles one of the *Origanum* spp., the most common being *O. vulgare*, the "sweet marjoram." True "hyssop" (*Hyssopus officinalis* L.) is also quite common in Asia Minor, and certainly is the plant mentioned fairly frequently in the later veterinary manuals (e.g. E. Oder, ed., *Mulomedicina Chironis* [Leipzig, 1901] 516 [p. 181, line 5], a "forest hyssop").

33. J. Berendes, trans. with comm., *Des Pedanios Dioskurides aus Anazarbos Arzneimittellehre* (Stuttgart, 1902) 19-22.

Sprengel's Latin,[34] or Goodyer's English,[35] will note some striking reinterpretations. Some of these are based on the better Greek text of Wellmann; others result from our judgment of Dioscorides' meaning. What the *Materia Medica* lacks in elegance is more than compensated by its content, and the *Preface* stands as an important document in the history of pharmacy, providing a guide to the basic principles followed in the rest of the work.

34. C. Sprengel, ed., with Latin trans., *Pedanii Dioscoridis Anazarbei De materia medica* (Leipzig, 1829 [in C.G. Kühn, ed., *Medicorum Graecorum opera quae exstant*, Vol. XXV]) 1: 1-9, with commentary on the *Preface* in 2: 339-342 (Leipzig, 1830 [Kühn, ed., *Medicorum Graecorum opera*, Vol. XXVI]).

35. See note 5 above.

The Translation

Text: M. Wellmann, ed., *Pedanii Dioscuridis Anazarbei De materia medica*, Praefatio, 1-9 (Wellmann, 1: 1-5).

Pedanius Dioscorides of Anazarbus

On Materia Medica

Preface

1. Although many authors old and new, my dear Arius, have put together books on the preparation, properties, and testing of drugs, I shall try to show you that my motive in this undertaking is neither idle nor absurd, for some of my predecessors did not give a complete survey, while others took most of their information from written sources. For example, Iollas of Bithynia and Heraclides of Tarentum touched on only a small portion of the subject, entirely omitted the botanical tradition, and made no mention at all of metallic drugs and spices. Crateuas the Rootcutter and Andreas the Physician — who are apparently more precise in this aspect — omitted many exceptionally useful roots and a few herbs.

2. However, one must admit that the older authors combined the paucity of their information with precision, in contrast to recent writers like Julius Bassus, Niceratus, Petronius, Niger, and Diodotus, all followers of Asclepiades. They have condescended to describe with a mere modicum of accuracy materia medica common and well-known

to everyone, but they have noted the properties and testing of drugs only cursorily. They have not measured the activities of drugs experimentally, and in their vain prating about causation they have explained the action of an individual drug by differences among particles, as well as confusing one drug for another.

3. To take one example, Niger, who seems to be the best of them, says that spurge-resin is the juice from olive spurge which grows in Italy, and that perfoliated St. John's wort is the same as triangular St. John's wort; he says that bitter aloe is dug up in Judea, and makes many equally wrong statements in defiance of manifest truth, which proves that he took his evidence not from his own eyes but from faulty secondhand written sources. Niger and the rest also made mistakes in organization of their material, some throwing together incompatible properties, others using an alphabetical arrangement which splits off genera and properties from what most resembles them. The result is almost impossible to memorize as a unit.

4. By contrast, I have had, almost from my earliest years, an unquenchable desire to know about the materia medica, and I have travelled a great deal — you are well acquainted with my soldier's life. At your insistence I have assembled my material into five books, and I dedicate my compendium to you in fulfilment of a debt of gratitude for your sentiments toward me: for you are naturally friendly to all men of culture, especially to our fellow professionals, and particularly to me. The attitude towards you of the excellent Laecanius Bassus is no small proof of your magnanimity, as I have discovered from my association with you and from observing your enviable mutual friendship.

5. I now encourage you, and any who may chance upon my book, not to look at my verbal facility but at my careful practical experience. For I have exercised the greatest precision in getting to know most of my subject through direct observation, and in checking what was universally accepted in the written records and in making inquiries of natives in each botanical region. Furthermore I shall endeavor to use a different arrangement and describe the classes according to the properties of the individual drugs. It is, I suppose, obvious to everyone that pharmacology is a necessity, closely linked to the whole art of medicine and forging with its every part an invincible alliance. It can also continue to extend its range of preparations and mixtures and its trials on patients, for the knowledge of each individual drug has a great deal to contribute.

6. I shall also include the common and familiar materia medica in order to make my work complete. Before anything else, it is appropriate to consider the storage and collecting of individual drugs in their proper seasons, for these matters in particular determine the weakness or efficacy of drugs. For example, herbs should be gathered when the weather is excellent, for it makes a great difference if the collecting is done after recent droughts or heavy rains. Similarly, sites are important, whether they are in the mountains, high up, windswept, cold and arid, for the properties of such plants are stronger. Those of plants from flat and wet localities, in the shade and not open to the wind, are generally weaker, especially when plants are gathered in the wrong season or when they are decayed through some weakness.

7. One should not fail to note that plants often ripen either sooner or later according to the specific character of the country and the climate. Some, according to their own particular nature, bear flowers and leaves in the winter, others produce flowers twice a year. Anyone wanting experience in these matters must encounter the plants as shoots, newly emerged from the earth, plants in their prime, and plants in their decline. For someone who has come across the shoot alone cannot know the mature plant, nor if he has seen only the ripened plants can he recognize the young shoot as well. Great error

is occasionally committed by those who have not made an appropriate inspection, as a result of the changes in the form of the leaves, the varying sizes of stems, flowers and fruits, and some other characteristics.

8. Indeed, precisely for this reason, some authorities have been deceived into saying that some plants bear neither flowers, nor stem, nor fruit, like dog's tooth grass, coltsfoot, and cinquefoil. But anyone who has seen these plants often and in many places will gain a particularly precise knowledge of them. Moreover, one must realize that some medical plants keep for many years, like white and black hellebore, and that the rest are useful for up to three years. On the other hand, one should gather the medicinal plants which are like young sprouts — French lavender, wall germander, felty germander, shrubby wormwood, Gallic wormwood, marjoram, and the like — when they are swollen with seeds, and their flowers before they fall off, their fruits while they are ripe, and the seeds when they are beginning to become dry before they drop off.

9. Extract juices from plants by infusion when the stems are recently sprouted, similarly with leaves; but to gain juices and droplike gums by tapping, take the stems and cut them while in their prime. Gather roots for laying up in storage, as well as roots for juices and root barks, when the plants are beginning to shed their leaves. The clean roots should be dried out immediately in areas free from moisture, but roots with earth or clay adhering should be washed with water. Flowers and such parts that have a sweetsmelling fragrance should be laid down in small dry boxes of limewood, but occasionally they can be serviceably wrapped in papyrus or leaves to preserve their seeds. As for moist drugs, any container made from silver, glass, or horn will be suitable. An earthenware vessel is well adapted provided that it is not too thin, and, among wooden containers, those of boxwood. Copper vessels will be suitable for moist eye-drugs and for drugs prepared with vinegar, raw pitch or juniper-oil. But stow animal fats and marrows in tin containers.

Commentary

Pedanius Dioscorides: Some earlier editions and translations before Wellmann gave Dioscorides the *nomen* 'Pedacius,' the reading of the MSS. But this is very doubtful, especially for a man of obvious Greek origin, and Wellmann made the simple correction, based on the evidence of Photius, *Bibliotheca*, Cod. 178, 124a12 (latest ed. by R. Henry, *Photius: Bibliothèque: "Codices" 84-185* [Paris, 1960; Budé], 2: 184) to Pedanius. This is a good Roman *nomen* and brings Dioscorides into connection with a celebrated and distinguished family. It was the custom for a non-Roman upon gaining Roman citizenship for himself and his descendants to take as his formal *nomen* that of the man who gained the citizenship for him — in this period usually the emperor, but also often a governor or a distinguished senator. The Pedanii originally came from Barcino in Hispania Tarraconensis and rose to prominence with the wealthy L. Pedanius Secundus, *consul suffectus* in A.D. 43

(*PIR*[1] P 146), and later Prefect of Rome in 56 (Tacitus, *Annals*, XIII, 30. 2); he was murdered by a household slave in 61 (ibid., XIV, 42. 1). Pedanius Secundus served as governor of western Asia Minor (Roman Asia) in the early 50s (D. Magie, *Roman Rule in Asia Minor* [Princeton, 1950; 2 vols.], 2: 1582), and Dioscorides could have met them then. Alternatively, Dioscorides' benefactor could have been his brother, Cn. Pedanius Salinator, consul in 60. It is tempting to suppose that Dioscorides had attended one or another of them during his career, but there are other possibilities.

Anazarbus, although today scarcely more than a large village, was among the most prosperous cities of Roman Cilicia in extreme southeastern Asia Minor. Dominated by a spectacular red acropolis, it claimed to be 'the first, the greatest, the most beautiful,' 'the most glorious' and the 'most precious' city of its region, claims bitterly and frequently disputed by Tarsus. See A.H.M. Jones, *The Cities of the Eastern Roman Provinces*, 2nd ed. (Oxford, 1971) 206-07, and Magie, *Roman Rule* 1: 275. Its most famous sons were both authors, Dioscorides and Oppian, who wrote just over a century later a long poem in hexameters on fishing, the *Halieutica*. Galen's reference to Dioscorides as coming from Tarsus (*Compound Drugs Arranged by Type*, V, 15 [ed. Kühn, XIII, 857]) is best explained as a slip of memory, or as a reference to Dioscorides' education and acquaintances, since Galen elsewhere says 'of Anazarbus' for Dioscorides (Galen, *Explication of Obscure Words in Hippocrates*, Preface [ed. Kühn, XIX, 64]).

Preface 1

Laecaniŭs Arius of Tarsus, to whom Dioscorides dedicated this work, was himself a doctor and pharmacologist, whose remedies were quoted by Andromachus the Elder and later by Galen (*Compound Drugs Arranged by Kind*, V, 13, and *Compound Drugs Arranged by Location of Ailment*, IX, 2 [ed. Kühn, XIII, 840, and 247]). According to Galen, he was a follower of Asclepiades (*Drugs by Location*, IV, 7, and V, 3 [ed. Kühn, XII, 776 and 829]) if the ascriptions are genuine; also *Drugs by Kind*, V, 15 [ed. Kühn, XIII, 857]), but Dioscorides' criticism of the doctrines of the Asclepiadeans regarding 'particles' (*Preface*, 2 [ed. Wellmann, p. 2, lines 3-5]) suggests that Arius' medical theories were not as restricted as theirs (see Commentary on *Preface* 2 below). Arius was a close

friend of Dioscorides, and Arius included in his own book of medical prescriptions one that Dioscorides had given to him for the staunching of bleeding (Galen, *Drugs by Kind*, V, 15 [ed. Kühn, XIII, 857]). Arius' interest in the genealogy of Hippocrates is mentioned in the *Life of Hippocrates* attributed to Soranus (in J. Ilberg, ed., *Sorani Gynaeciorum libri IV, De signis fracturarum, De fasciis, Vita Hippocratis secundum Soranum* [Leipzig, 1927], 1 [p. 175]).

. . . preparation, properties, and testing of drugs: . . . περὶ τῆς τῶν φαρμάκων σκευασίας τε καὶ δυνάμεως καὶ δοκιμασίας . . . As obvious as this will be to the classical scholar, Dioscorides does *not* have in mind a clearly defined, carefully controlled, "laboratory technique," but simply the careful, detailed, dogged observations that characterize the *Materia Medica*. He normally uses θεραπεύω rather than σκευάζω to suggest specific preparation of substances for medical employment (e.g. *Materia Medica*, II, 76. 2, 4, and 6 [ed. Wellmann, 1: 151-153] in the particular instructions for the preparation of lard, bear fat, and the suet of goats, sheep, and deer, and the fat of a bull), but σκευασία and θεραπεία are apparently synonyms, since both terms appear in some passages interchangeably. This indicates a fluid vocabulary in the most technical aspect of Roman pharmacy, and the Roman pharmacologists struggled constantly in their attempts to be precise while using words drawn from a common stock of 'ordinary' terms, well illustrated by the technical use of the general word σκευασία in presumed distinction from the more narrow, particular meaning of σύνθεσις in the Greek of the 2nd century A.D. Σκευασία has come to mean "compound," viz. the combination of ingredients mixed together, e.g. the "plaster-kollyrion" (σκευαστόν) of Lucian, *Alexander the False Prophet*, 21; and Galen, *Compound Drugs Arranged by Kind*, V, 6 (ed. Kühn, XIII, 814) writes σκευαστέον γὰρ ἐστι τὸ φάρμακον, even while employing σύνθεσις as part of the title of the work. It is with words like these, each with a shade of meaning often determined by textual and historic context, that many modern students of ancient pharmacy have been led astray by assuming constant equivalencies or long-term synonyms: Dioscorides' use of two words as synonyms will not necessarily be the same as those of Galen; each writer grappled with the problems of technical precision in his own way, and one must assume a shifting in meaning, much as one notes shifts in nuances of 'ordinary' Greek words from the late Hellenistic era through the Greek of the Roman Empire. One also has to be reminded that the Greek

of Dioscorides (or Galen, or of any other author, medical or otherwise) was meant to be understood and was part of a living, continually-evolving literary and spoken language. Dioscorides' "preparation" thus has historical antecedents in a particular aspect of drug lore, but which he now has redefined for his own work — in distinction from, e.g., the notion of "preparation" as found in an anecdote about Eudemos of Chios (4th century B.C.), a "drug seller" who sat in the agora ἐπὶ τῶν σκευῶν, "besides the products of his trade" (Theophrastus, *Historia Plantarum*, IX, 17. 3). Dioscorides is well aware that the "preparation" of a drug most often stemmed from a vaguely empirical folk tradition, and each drug vendor had his own method of preparation of various simples. It is Dioscorides' basic intention to put some order into this pharmaceutical chaos by choosing what he believes to be the best manner of "preparation" of each medicinal, an enormous task in itself. This, of course, links firmly with his "new" method of drug classification: the "properties" of the individual drugs, viz. the fully-prepared medicinals grouped by preparation technique (*Preface* 5) and then broadly classed by their effect on particular ailments, a "drug affinity" somewhat similar to modern pharmacognosy. He can then argue that a particular way of "preparation," chosen from the dozens current for each of the simples, would lend a better chance of precision in predicting the pharmacology. If this appears obtuse and fuzzy to the modern chemist or pharmacologist, he should again reflect that precision — in the modern sense of the word — did not form a part of pharmacology until well into the 19th century, when laboratory techniques had become refined enough to produce substances according to demand, and there was a viable chemical theory by which chemists and pharmacologists could interpret the results of laboratory studies and experiments.

Even though δύναμεις is normally translated as "powers" or "faculties," Dioscorides is speaking specifically and continuously about what drugs "do." Galen in his *Mixtures and Properties of Simples* (ed. Kühn, XI, 379-892 and XII, 1-377) also assumes this sort of definition for δύναμεις, viz. both potentiality and action, which would encompass the modern pharmacological notions of drug "action" as well as "property."

Most troublesome to the modern reader, accustomed to carefully regulated experiments with animals as new drugs are produced by pharmaceutical companies, will be Dioscorides' concept of "testing" (δοκιμασία) drugs. In the Greek of the 4th

century B.C., as exemplified in Aristotle's works, a primary meaning of δοκιμάζω included how one responded to the evidence of the senses (e.g. Aristotle, *Nicomachaean Ethics*, 1118a28 [on winetasters], and *Historia Animalium*, 491a21 [on how each country 'judges' coinages according to its own coins]) coupled with assimilation and association of "familiar" data; thus one made judgments by that which is most familiar in Nature, Man himself. The meaning we encounter in Dioscorides is now extended and broadened for the "testing" of drugs on the sick, and he has gathered much data from folk tradition, which had, in its own, slow, laborious, heartless way accumulated a respectable array of details on beneficial and harmful drugs. The "testing" of drugs as recorded by Dioscorides is either the confirmation or refutation of the data he has found in written authorities, or has gathered from folk traditions ("to be examined and be approved" would also be part of his basic notion), or the observation of reaction to drugs administered to patients. Modern medical ethics rejects this approach, but classical antiquity had the famous example of Attalus III of Pergamon (138-133 B.C.), who became an expert in the cultivation and administration of poisonous plants and extracts, sometimes to the consternation of his 'friends' who might receive harmless herbs moistened with toxic juices as 'presents' (Justin-Trogus, *Epitome historiarum Philippicarum*, XXXVI, 4. 3 [ed. Otto Seel (Stuttgart, 1972; Teubner) 250]). Galen, however, simply notes that Attalus was intrigued by all sorts of drugs, and that he gave poisons to condemned criminals so that he could test antidotes upon them (Galen, *Compound Drugs Arranged by Kind*, I, 13 [ed. Kühn, XIII, 146], and *Antidotes*, I, 1 [ed. Kühn, XIV, 2]). Attalus' medical and pharmacological interests were wide-ranging, and he is quoted as the inventor of a beneficial plaster for skin ulcers, as an investigator of the therapeutic uses of animal secretions, and as a student of medical entomology (Esther V. Hanson, *The Attalids of Pergamon*, 2nd ed. [Ithaca, New York, 1971] 144-45 with reffs.). Added to the "drug testing" activities of King Attalus of Pergamon was the similar interest in antidotes by Mithridates VI of Pontus (c. 120-63 B.C.), also cited by Galen as testing poisons and their antidotes on prisoners (Galen, *Antidotes*, I, 1 [ed. Kühn, XIV, 2]), as well as inventing a "wide spectrum" antidote thereafter called a 'Mithridatium' (see also Gilbert Watson, *Theriac and Mithridatium* [London, 1966] 33-44). Mithridates was served by the renowned pharmacologist, Crateuas (see Commentary below), noted for his skilled knowledge of herbs,

metallic drugs, antidotes, and for a fundamental (and probably illustrated) manual of medical botany (Galen, *Mixtures and Properties of Simples*, VI, preface; *Commentary on Hippocrates' Nature of Man*, II, 6; and *Antidotes*, I, 2 [ed. Kühn, XI, 795 and 797; XV, 134; and XVI, 7]). With the striking exceptions of Erasistratus and Galen, the idea of systematic experimentation with animals for the benefit of man was not put into practice in antiquity. See Heinrich von Staden, "Experiment and Experience in Hellenistic Medicine," *Bulletin, Institute of Classical Studies* [London] 22 (1975): 178-99, and James Longrigg, "Superlative Achievement and Comparative Neglect: Alexandrian Medical Science and Modern Historical Research," *History of Science* 19 (1981): 155-200 [177-185].

. . . information from written sources. The doctors of the so-called Empiricist sect laid great stress on the writing of case-histories and the preservation of such information in written form. The word that is used to describe these accounts, ἱστορία, is of course familiar to us as 'history,' which in origin was associated not with written applications, but with active inquiry. The employment of the word by Dioscorides as a deliberate opposition to such investigation shows how far the term had come since the days of Herodotus, and is the earliest instance recorded of such a usage, although the evidence of Galen indicates that it had long been familiar among the Empirics. See Von Staden, "Hellenistic Medicine," *Bulletin, Institute of Classical Studies* 22 (1975): 190, and Karl Deichgräber, *Die griechische Empirikerschule*, 2nd ed. (Berlin/Zürich, 1965) esp. 49-51.

Iollas of Bithynia (c. 250-200 B.C.?) wrote on drugs, as well as on the cities of the Peloponnesus. His drugs are mentioned by Celsus, *De medicina*, V, 22. 5, and by Pliny, *Natural History*, XX, 187 and 198, who includes him in his list of authorities for Books XII, XIII, XX-XXVIII, and XXXIII-XXXV. Galen lists Iollas among a number of sources in *Antidotes*, I, 2 (ed. Kühn, XIV, 7), and the *Scholia on Nicander's Theriaca*, 683, cites him for a reference to the plant called by Nicander ὅλωθροῖος, which the scholiast says Iollas has considered in his tract on herbs, and which is normally called πύρεθρον, probably one of the Balkan chrysanthemums (*Chrysanthemum cinerariaefolium* Vis., or *C. coccineum* Willd.), long used in the preparation of insect-repellent powders.

Heraclides of Tarentum, active in the first quarter of the 1st century B.C., was perhaps the greatest physician of the Empiricist sect. His studies at Alexandria with the pharmacologist Mantias also introduced him to a tradition of Hippocratic scholarship, and he may have been responsible for a resurgence of medical studies at Alexandria in the years before Caesar's conquest of Cleopatra. Galen delivers a rare eulogy on him: "A witness of outstanding integrity, who did not invent falsehoods to support a doctrine, as did the majority of the Dogmatists, and was fully trained in his art, and, if ever a man was, skilled in medical tasks" (Galen, *Commentary IV on Hippocrates' Joints*, 40 [ed. Kühn, XVIII, part 1, 735]). His major work on pharmacology was addressed to the female physician, Antiochis of Tlos, and at least two others, *To Astydamas* and *The Soldier*, devote more than average space to pharmacology; other works, including *Treatment of Internal Diseases*, *Nicolaus*, and *Regimen*, also emphasized pharmacology. *Astydamas* had particular consideration of antidotes against snakebite, as well as remedies for scorpion stings and the bites of spiders (Galen, *Antidotes*, II, 13 [ed. Kühn, XIV, 181-82]). *Soldier* may have considered military medicine. *Internal Diseases*, *Nicolaus*, and *Regimen* (esp. *Internal Diseases*) are quoted frequently by Caelius Aurelianus (index entries to Drabkin ed. [Chicago, 1950], 1007). The Vienna Codex of Dioscorides, fol. 3^{v} ("The Seven Physicians") includes Heraclides and Mantias in its collection of portraits of famous pharmacologists. There is an excellent collection of fragments of his writings in Deichgräber, *Die griechische Empirikerschule*, pp. 172-202, with discussion pp. 258-61, and additional texts pp. 409-12 (in English and German transations), and a brief but penetrating account by P.M. Fraser, *Ptolemaic Alexandria* (Oxford, 1972; 3 vols.) 1: 361-62, with nn. 206-16, 2: 533-35 [trans. of Galen quotation by Fraser, 1: 362].

. . . omitted the botanical tradition: What Dioscorides means by the "botanical tradition" (βοτανική) is uncertain. Heraclides certainly concerned himself with the preparation and testing of drugs, and is praised for his experiments (Frg. 197 Deichgräber [p. 186]), and Galen puts him in the company of Crateuas, Mantias, and Dioscorides in terms of the quality of his "preparation and testing of drugs" (Frg. 199 Deichgräber [p. 187]); but to judge from what survives of his work, Heraclides may not have given detailed botanical descriptions of the plants from which he made his drugs. Similarly, Dioscorides' strictures on his omission of metals

and spices are perhaps exaggerated, for Frgs. 203, 207, 208, 213, and 218 (Deichgräber, pp. 188, 190-93, 194, and 195) show recipes with such ingredients. Dioscorides may again be claiming only that Heraclides made no systematic study of these topics. Of the deficiencies of Iollas' work, one can say little, although the recipe preserved by Celsus, *De medicina*, V, 22. 5, includes charred papyrus, probably quicklime (CaO), arsenic trisulfide (As_2S_3: yellow orpiment [*auripigmentum*]), and arsenic disulfide (As_2S_2: realgar or red orpiment [*sandaraca*]), which suggest a detailed understanding of two forms of naturally-occurring arsenic — both of venerated use in depilating hides and making pigments for paints.

Crateuas, doctor to Mithridates VI of Pontus, c. 100 B.C., was the most celebrated pharmacologist of antiquity. He was the "rootcutter" *par excellence*, ample testimony to his expertness, practical experience and distaste for armchair pharmacology. He is often quoted by Galen and Pliny the Elder, and probably is embedded in some of Dioscorides' own account (Frg. 1, in the collection of Crateuas in the Wellmann ed., Dioscorides 3: 144-46 with testimonia pp. 140-44). His portrait also appears in the pharmacological pantheon of the Vienna Dioscorides (fol. 3^v), which includes as parallel passages facing the text long quotations taken from his writings (Wellmann, Frgs. 1-10: the only known direct quotations). Charles Singer, "The Herbal in Antiquity and its Transmission to Later Ages," *Journal of Hellenic Studies* 47 (1927): 1-52, argued that Crateuas' illustrated herbal formed the basis for all subsequent botanical illustration [pp. 5-18]. Max Wellmann, *Krateuas* (Berlin, 1897) remains the best study.

Andreas, another of the worthies whose portrait graces Fol. 3^v of the Vienna Dioscorides, was court doctor to Ptolemy V Philopator and was murdered instead of his royal master before the Battle of Raphia in 217 B.C. (Polybius, V, 81. 6). Although he is often quoted in the pharmacological literature, he does not appear to have been as diligent or as scrupulous as some other authorities. His contemporary Eratosthenes called him a "literary Aegisthus" [viz. "Adulterer"], perhaps a reference to some medical plagiarism (Fraser, *Alexandria* 1: 371, and 2: 546-47 n. 293), while Heraclides, Frg. 202 (Deichgräber, p. 187) describes him as an impostor, like a herald who issues a Wanted notice for a runaway slave without

ever having seen the man. His biography of Hippocrates was notoriously inaccurate and scandalous (Soranus, *Life of Hippocrates*, 4 [ed. Ilberg, p. 175]).

Preface 2

Julius Bassus heads the list of 'recent' and unsatisfactory writers on drugs. His correct name is not certain: four MSS and the early Latin version call him Tullius, as does Caelius Aurelianus, *Acute Diseases*, III, 16. 134 (ed. Drabkin, p. 385); but the other MSS and his near contemporary, Scribonius Largus in his *Conpositiones*, 121 (ed. G. Helmreich [Leipzig, 1887] 51), have Julius. Pliny includes him in his list of Latin authors, but adding "he writes in Greek," as a source for Books XX to XXVII and XXXIII and XXXIV, but not for Books XIII to XV or XXX to XXXII. He is possibly also to be identified with Bassus the Stoic cited from Andromachus by Galen, *Compound Drugs Arranged by Kind*, VII, 13 (ed. Kühn, XIII, 1033). He seems to have been a Roman, active c. A.D. 10-40, who wrote in Greek, not out of affectation, but to secure a wider audience for his work in the Greek world.

Niceratus was roughly contemporary with Bassus, and hence could not have been a direct pupil of Asclepiades. Niceratus also wrote on catalepsy, and is quoted by Pliny, *Natural History*, XXXII, 101 on using a frog's heart beaten up with honey as a treatment for dysentery, but this is probably an indirect citation since Niceratus does not appear in the list of source-authors. Galen's quotations from Niceratus are similarly secondhand (e.g. in Damocrates in Galen, *Antidotes*, II, 15 [ed. Kühn, XIV, 196-201]).

Petronius, Niger, and Diodotus: Dioscorides' Greek is difficult here, and many scholars have been led astray into positing two doctors called Petronius Niger and Petronius Diodotus, relying on Pliny, who always refers to Petronius Diodotus in his listing of sources (there would be, however, no objection to punctuating so as to make two persons), as well as two places in the text of the *Natural History*, XX, 77, and XXV, 110. The evidence of Erotian (ed. Ernst Nachmanson, *Erotiani Hippocraticarum collectio* [Göteborg, 1918]), 98 (Diodotus), 94 and 133 (Niger), and 98 and 117 (Petronius) [ed. Nachmanson, pp. 62, 59, 91, and 79], and even Pliny himself (*Natural History*, XXIV, 145) makes it clear that there are three physicians, Petronius, Niger, and Diodotus, all of

whom were roughly contemporary and writing in the first half of the 1st century A.D. Petronius is thus to be identified with the Petronius Musa, whom Galen claims to be among the most accurate authors on pharmacology (*Compound Drugs Arranged by Kind*, II, 5 [ed. Kühn, XIII, 502], where the grammatical construction closely parallels that in this passage of Dioscorides). Galen's attempt to fix the relative date of Musa (probably Petronius, but Antonius is also possible) only further muddies the waters. Fabricius, *Pharmakologen*, 243.

Sextius Niger, said by Caelius Aurelianus, *Acute Diseases*, III, 16. 134 (ed. Drabkin, p. 386) to be a friend of Bassus, is another Roman who wrote in Greek. Pliny, *Natural History*, XXXII, 26, calls him "very diligent in medicine," and Galen, *Mixtures and Properties of Simples*, VI, pref. (ed. Kühn, XI, 797) includes him with Dioscorides, Heraclides, and Crateuas as essential reading for the would-be pharmacologist. Niger too finds his place in the Vienna pantheon, gazing at Xenocrates and Pamphilus, the very authors against whom Galen champions Niger's qualities. Pliny used him extensively, and so, without acknowledgement, did Dioscorides. Cf. Pliny, *Natural History*, XXXII, 26 = Dioscorides, II, 24, and XXIX, 76 = II, 62. Wellmann collected the fragments of Sextius Niger in his edition of Dioscorides, 3: 146-148. Important is Max Wellmann, "Sextius Niger. Eine Quellenuntersuchungen zu Dioskorides," *Hermes* 24 (1889): 530-69. See also Jerry Stannard, "Pliny and Roman Botany," *Isis* 56 (1965): 420-25. Dioscorides' censure about these Asclepiadeans cannot be substantiated from the extant evidence. Suffice it to say that Galen, who is certainly no friend to the Asclepiadeans or to book-taught pharmacologists, thinks highly of Petronius and Niger. Nor can one use this passage to prove Dioscorides' adherence to the Empiricist sect, for he is merely stressing the virtues of accuracy, firsthand information, and comprehensiveness; Pliny could be called a member of the sect for exactly similar complaints about others.

. . . followers of Asclepiades: Asclepiades of Cius (Prusias ad Mare) in Bithynia (died c. 92 B.C.) was one of the more remarkable figures in ancient medical history. If one trusts the testimony of Pliny, *Natural History*, XXVI, 12-13, Asclepiades had come to Rome as a young man to seek his fortune as a rhetorician, and then switched to medicine, after he had realized that he could make a better living as a physician. His underlying theory of medicine was a

simplistic and shrewd adaptation of philosophical ideas applied to the explanation of illness and health: life and death were accidental, illness resulted from the body's pores being blocked by too many "particles," and health could be restored by unblocking those pores. Asclepiades rejected anatomy in favor of symptoms, and his doctrine of "particles" is similar to some of the notions of Heraclides of Pontus — though not derived from him as argued by H.B. Gottschalk, *Heraclides of Pontus* (Oxford, 1980) 37-57 — and is loosely associated with the concepts of "atoms" as enuciated by Epicurus, who had elaborated upon the thoughts of Democritus and Leucippus. Asclepiades was apparently fortunate in his contacts with the great and powerful of Rome: Cicero, *De oratore*, I, 14. 62, securely places him in historical context with Lucius Licinius Crassus in the 90s B.C. Asclepiades rejected harsh pharmaceuticals in favor of gentle and soothing lotions and salves (John Scarborough, "The Drug Lore of Asclepiades of Bithynia," *Pharmacy in History* 17 [1975]: 43-57), and since he believed that wine was a universal medium, he was recalled in some later sources as the "Wine-Giver."

Medical historians, both in antiquity and since the 16th century, have assumed a 'school' tradition that derived from Asclepiades through his pupil, Themison (fl. c. 75 B.C.[?]), and the apparent charlatan, Thessalus of Tralles (fl. A.D. 60), and which became commonly known by the name of Methodists, "possessors of a method of healing." Thessalus in particular was viciously excoriated by Galen throughout his writings (e.g. Galen, *Against Julian*, I, 4 [ed. E. Wenkebach, *Galeni Adversus Lycum et Adversus Iulianum* (Berlin, 1951) 33-34]; Galen, *Method of Medicine*, I, 1 [ed. Kühn, X, 4], etc. Cf. Pliny, *Natural History*, XXIX, 9), and such polemics have tended to damn all the followers of Asclepiades. But just as there were various sects with a method (cf. M. Modius Asiaticus, 'champion of a method,' and a Methodist doctor from Smyrna, c. A.D. 80 [*CIG*, 3283]), so not every follower of Asclepiades expressed exactly the same doctrines as Themison or Thessalus; Dioscorides' reference to his contemporaries as "Asclepiadeans" may well be to distinguish them from Themison's more simplistic therapies. Indeed, the treatment prescribed by Bassus against rabies (Caelius Aurelianus, *Acute Diseases*, III, 16. 134 [ed. Drabkin, pp. 384-86]) shows independent thought and a reluctance to apply a straight forward alternation of restorative and alternative (metasyncritic) therapy. It is uncertain how long the Asclepiadean sect continued, but the recent discovery of an in-

scription from the wilds of backwoods Cilicia, about 100 miles from Tarsus, has revealed a civic physician of the 3rd or 4th century who claimed to be an Asclepiadean. See G. Bean and T.B. Mitford, "An Epigraphical Journey in Rough Cilicia," *Denkschriften der Akademie der Wissenschaften in Wien*, phil.-hist. Kl., 102 (1970): 65, with n. 38 and plate 52.

The chronology and interpretation of the Asclepiadean 'school' is full of difficulties. For the dating of Asclepiades and Themison given above, we follow that in a forthcoming study by Elizabeth Rawson, who argues that the crucial passage in Cicero, *De oratore*, I, 14. 62, shows Asclepiades as already dead by 92 B.C., a view espoused long ago by Antonio Cocchi (see R.M. Green, *Asclepiades: His Life and Writings. A Translation of Cocchi's Life of Asclepiades and Gumpert's Fragments of Asclepiades* [New Haven, 1955] 8 and 60). The standard view places his death at least fifty years later, with the consequent downward shift in the date of his only certain pupil, Themison, as in M. Wellmann, "Asklepiades aus Bithynien von einem herrschenden Vorurteil befreit," *Neue Jahrbücher für das klassische Altertum* 21 (1908): 684-703, and Ludwig Edelstein, "The Methodists" in Owsei and C. Lilian Temkin, eds., *Ancient Medicine: Selected Papers of Ludwig Edelstein* (Baltimore, 1967) 173-91. The recent article by J. Benedum, "Der Badearzt Asklepiades und seine bithynische Heimat," *Gesnerus* 35 (1978): 20-43, which attempts to link his water therapy with the hot springs in the region of Bursa (Prusa), fails to differentiate "of Prusias" from "of Prusa," although the evidence of Pseudo-Galen, *Introduction*, 4 (ed. Kühn, XIV, 683) is absolutely clear.

particles: these are the ἄναρμοι ὄγκοι, most fully explicated by Gottschalk, *Heraclides*, 37-57. There is much debate about what these 'seamless particles' (Gottschalk, 42) were, both in the theory of matter of Heraclides and in the medical atomism of Asclepiades. In the theories of Asclepiades, these particles clog pores to cause disease (Gottschalk, 46), but the exact nature of the particles has engendered a large literature. See esp. I.M. Lonie, "The ἄναρμοι ὄγκοι of Heraclides of Pontus," *Phronesis* 9 (1964): 164, and "Medical Theory in Heraclides of Pontus," *Mnemosyne* 4th s., 18 (1965): 126-43; and W.A. Heidel, "Antecedents of Greek Corpuscular Theories," *Harvard Studies in Classical Philology* 22 (1911): 111-72, and "The ἄναρμοι ὄγκοι of Heraclides and Asclepiades," *Transactions of the American Philological Association* 40 (1909): 5-21.

spurge-resin (τὸ εὐφόρβιον ὀπόν): a shrub that is native to North Africa, one of the 'spurges' (*Euphorbia resinifera* Berg.) which yields a resin widely used in ancient pharmacy as a drastic purgative (e.g. Philo of Tarsus in Galen, *Compound Drugs Arranged by Location of Ailment*, IX, 4 [ed. Kühn, XIII, 269 and 270, as "explained" by Galen]). Dioscorides' main entry for the shrub (III, 82 [ed. Wellman, 2: 98-99]) keys it without much doubt.

olive spurge (χαμελαία): *Daphne oleoides* Schreb. is a small shrublet that may reach 50 cm. in height, and has leather-like evergreen leaves, obovate to elliptical, that average 3 cm. in length. *D. oleoides* receives a short entry in Dioscorides, IV, 171 (ed. Wellmann, 2: 320). Its usefulness was for purging. In the convoluted tradition preserved in Nicander, *Alexipharmaca*, 48, the olive spurge is part of an antidote for aconite poisoning — which is rather curious, since the bark and berries of *Daphne* spp. are toxic. Dioscorides, IV, 171, accurately describes the sensation of ingestion of *Daphne* as "bitter, sharp, biting the tongue, and irritating to the windpipe." Mezereum (mesereon), the modern name for the vesicant and epispastic made from the dried bark of *Daphne* spp. (*BPC*, 1934; *Swiss Pharmacopoeia* 1934), which contains mezerein (a toxic resin), an acrid glucosidal resin, daphnin, umbelliferone, and a fixed oil, causes a burning sensation in the mouth and stomach, followed by almost immediate vomiting. ". . . the source of information about the toxicity of *Daphne mezereum* as it appears in a contemporary compendium of poisonous plants can be traced back . . . reference by reference, to experiments with dogs conducted by M.J.B. Orfila before 1800. Even though his work was experimental . . . Orfila added little to the literature that had not already been set forth by Dioscorides nearly two millennia earlier" (J.M. Kingsbury, "The Problem of Poisonous Plants," in A. Douglas Kingborn, ed., *Toxic Plants* [New York, 1979] 1-6 [3]).

perfoliated St. John's wort and triangular St. John's wort: The genus *Hypericum* (in Guttiferae) is one of the more difficult in botanical taxonomy. Τὸ ἀνδρόσαιμον is probably *H. perfoliatum* L., a St. John's wort having sepals with black glands on the margin, and τὸ ὑπερικόν is most likely *H. triquetrifolium* Turra, another St. John's wort having sepals without black glands on the margins. A trained botanist could of course distinguish between the two

plants by the size and the shapes of the leaves, but even with today's more exacting standards, the smaller leaves of *H. perfoliatum* are commonly and wrongly assumed to be like the larger ones of *H. triquetrifolium*, particularly if the plants are not observed in the field. Dioscorides must have forgotten the harsh words he had for Niger on this point, because in III, 154 (ed. Wellmann, 2: 161) one reads that ἀνδρόσαιμον is another name for ὑπερικόν. From the description of another ὑπερικόν in I, 19. 3 (ed. Wellmann, 1: 25), it would appear that Dioscorides is aware of another kind of St. John's wort, perhaps *H. revoltum* L. In III, 154, one reads that St. John's wort is an excellent diuretic and is good for expelling the menses; Nicander, *Alexipharmaca*, 603, includes St. John's wort (ἡ ὑπερικός) as part of an antidote against litharge, and Galen, *Mixtures and Properties of Simples*, VIII, 20. 5 (ed. Kühn, XII, 148) includes τὸ ὑπερικόν as useful as a diuretic, emmenagogue, and in the compounding of salves for burns. The active principle derived from *Hypericum* spp. is called hypericin (4,5,7,4',5',7'-hexahydroxy-2,2'-dimethylnapthodianthrone), a red pigment, which has diuretic and astringent properties for humans, and harmful photosensitization effects on cattle and sheep.

aloe: If Niger had never seen an aloe (and the likelihood is that Dioscorides himself may not have actually seen one growing either), it is easy to understand why he might have presumed the 'aloe' had been 'mined' somewhere. In its prepared form (modern as well as ancient), aloe is exported as brittle, blackish-yellow shiny lozenges (Dioscorides, III, 22. 2 [ed. Wellmann, 2: 28]; Albert F. Hill, *Economic Botany*, 2nd ed. [New York, 1952] 252; and George Edward Trease and William Charles Evans, *Pharmacognosy*, 11th ed. [London, 1978] 394-99), which could, in the case of the finest variety, be easily melted and combined with other drugs. From the description of aloe in Dioscorides, III, 22. 1-5, as well as other sources (e.g. Antyllus in Aetius, III, 24 [ed. A. Olivieri, *Aetii Amideni Libri medicinales I-IV* (Leipzig, 1935) 280; Soranus, *Gynecology*, I, 50. 2, and III, 41. 7 [ed. Ilberg, pp. 36 and 120]; and among many references in Galen, e.g. *Mixtures and Properties of Simples*, VI, 23 [ed. Kühn, XI, 821-22]), one can easily determine that the plant is *Aloe perryi* Baker, the Socotrine aloe, from the island of Socotra, located in the Indian Ocean, 150 miles due east of Cape Guardafui (Somalia). Like other species of aloe (*A. ferox* Miller [the Cape aloe of South Africa] and *A. barbadensis* Miller [the Barbadoes aloe of the West Indies = *A. vera* L. = *A. vulgaris* la Marck], as well as

several others), the Socotrine aloe is a succulent liliaceous plant that forms clusters of very fleshy leaf blades which are normally prickly on the margins and tips; it is generally stemless, although occasional branching stems may occur, and the Socotrine aloe bears yellow-orange, red, or white flowers on erect spikes with six-lobed, tubular perianths. *A. vera*, which occurs in southern Arabia and northeastern Africa, has become naturalized in southern Europe in the 20th century (Oleg Polunin, *Flowers of Europe* [London, 1969], No. 1598 [p. 492]), but apparently the European variety does not yield the potent extract characteristic of the 'native' Arabian plant (an aspect that seems also to appear in Dioscorides, III, 22. 2 [ed. Wellmann, 2: 28] as he speaks of aloe growing on Andros and other islands, but this plant did not have the good properties of the Arabian or of the "best" kind from India [read here 'Socotra' in the context of "other islands"]). Both Dioscorides and medieval Arabic sources (esp. Cyril Elgood, trans., "Tibb-ul-Nabbi or Medicine of the Prophet," *Osiris* 14 [1962]: 33-192 [94: the "best aloe" from Socotra]) show that Socotra remained the sole locale for the growth, gathering, and exportation of this particular species.

Modern preparation of the drug follows procedures that were familiar to Dioscorides and his sources: leaves of the aloe are cut, placed in troughs, and the slowly exuding juice is collected; then the juice is placed in pans for the evaporation of the volatile fractions, and the residue turns into a viscous, black mass which soon solidifies. Modern biochemistry has isolated a substance called aloin (barbaloin) from the plant. Aloin is a far milder laxative than the earlier preparations of the inspissated juice from the leaves of the plant; this production of a milder form is a remarkable parallel to Dioscorides' comment that aloe, mixed with other medicines, does not harm the stomach as much as 'straight' aloe. Veterinary medicine still employs aloe as a laxative for adult horses, cattle, sheep, and goats (and sometimes dogs), while milder derivatives (aloin and aloe-emodin [3-hydroxymethylchrysazin; rhubarberone, also from various spp. of *Rheum* (rhubarb)]) remain in the pharmacopoeia as laxatives.

Since Dioscorides provides the first extensive description of aloe in the history of western pharmacy, the drug was introduced in quantity only shortly before his time. Celsus, *De medicina*, I, 3. 25-26, mentions aloe — but only in this passage (other references to "aloe" are to aloe-wood, *Aquilaria malaccensis* la Marck) among some scrappy suggestions for laxatives. Possibly both Dioscorides

and Galen borrowed their descriptions of Socotrine aloe from Heras of Cappadocia (Fabricius, *Pharmakologen*, 209), which means that this "best" aloe was known in the Greek east at the earliest around 30 B.C., and the drug entered the listings of the Roman west shortly before Celsus compiled his encyclopedia in the reign of Tiberius. It is important to determine at what date Socotrine aloe was introduced into western pharmacy; such information might help solve the problem of when the monsoon patterns became widely known and exploited, since Socotra is situated on the route to India, and was reached by use of monsoon winds. Once the trade between Egypt and India became a regular event — after the monsoons were understood by navigators — ships would, by necessity, call at Qana (on the coast of Arabia: an emporium for aloe, frankincense, and myrrh) and Socotra, and the supply to the west would be assured. Unfortunately, the recent lengthy study by Manfred G. Raschke, "New Studies in Roman Commerce with the East," in H. Temporini, ed., *Aufstieg und Niedergang der römischen Welt*, 2: part 9, 2nd part (Berlin, 1978), 604-1378 [esp. 650-76, "The Spice Trade"], adds little to our understanding, for the major arguments disappear under a mountain of information. Regrettably, Dioscorides is rarely used (only four citations), and although Raschke professes to reject them, the botanical fancies of Miller and Detienne still exercise some effect on his speculations. One must yet turn to the sound studies by Warmington, Charlesworth, and others, to gain a clearer perspective on the numerous problems of Roman trade with the Far East. See also n. 11 to the Introduction above.

alphabetical arrangement: This sentence is by no means easy to understand, but what Dioscorides appears to be saying is that by sticking to an alphabetical arrangement (κατὰ στοιχεῖον) these physicians separated related genera from each other and within (or possibly in addition to) these groupings, plants with similar properties from each other. Dioscorides is intent on a classification suitable either for the practical botanist or for the doctor (what drugs cure the same disease?), and scorns the perhaps academic register of these physicians. L.W. Daly has shown how the earliest examples of classification by alphabetical order derive from the libraries of the Ptolemaic Empire (including Cos), and Dioscorides' reference to its use for classifying plants is among the first instances of its employment for things other than books. Daly follows the earlier arguments of Max Wellmann that Niger,

and possibly Crateuas, are the authors accused here, relying on the evidence in Pliny's *Natural History*, e.g. XXII, 73-91 (from Xenocrates?) that suggests a Greek alphabetically arranged source taken over and translated by Pliny into Latin. See L.W. Daly, *Contributions to a History of Alphabetization in Antiquity and the Middle Ages* (Brussels, 1967) 36-37. Dioscorides' complaints did not prevent his own text from being reorganized on similar lines, and it is ironic that the oldest MS, the famous Vienna Codex of A.D. 512 (Vienna, med. gr. 1), preserves this distressing arrangement — distasteful to Dioscorides. Medieval plant glossaries are on the whole alphabetical, e.g. the Alphita glossary, or the late Byzantine botanical glossaries edited and published by A. Delatte (Paris, 1939); these would, as Dioscorides pointed out, have made it hard to remember what range of drugs was available to treat a single condition. The alphabetical list was perhaps easier to memorize but Dioscorides' point is that it is important to remember things in the right conjunction.

Preface 4

... my soldier's life: οἶσθα γὰρ ἡμῖν στρατιωτικὸν τὸν βίον. On these six words more ink has been spilled than over almost any other passage in Dioscorides, and a whole biography has been reconstructed upon them. But fundamental questions have rarely been asked, and too much has proceeded on the basis of unchallenged assumptions. Professor Riddle's scepticism, although not entirely justified, has at least the great merit of compelling a detailed re-examination of the problems.

The first is the precise meaning of στρατιωτικὸν τὸν βίον. The conjunction of βίος, life, with an adjective of a profession, 'trading,' 'sailor's,' 'teacher's,' is a common circumlocution for saying that the speaker or the person referred to exercised that profession as a merchant, sailor, or teacher, and so the phrase here should mean 'the life of a soldier' or 'soldier's life.' It is in theory possible that the adjective should be translated as 'soldier-like,' to refer to the quasi-military life of a travelling doctor or pharmacist, as Professor Riddle would like, but there is no other example of the use of this adjective in this sense. Thus, in the absence of any indication to the contrary in the immediate text, we take the phrase to show that Dioscorides had served at some time in the army, and that he had travelled with it and thereby seen certain plants.

The words could also be pressed to indicate that Dioscorides was a common soldier, rather than a medical officer, and that he was complaining about his past lot, but the point here is one for pride, not for dissatisfaction. Besides, unless the context specifically shows a dichotomy between soldiers and officers, the adjective encompasses all ranks within the army and should not, in the absence of evidence to the contrary, be given an excessively precise connotation.

It is also possible to take the words somewhat ironically, but prefaces are rarely a place for irony, for they are public documents even if privately addressed, and irony is always the last refuge of the baffled translator.

Dioscorides, then, had seen military service, but where and for how long? Professor Riddle, in a letter to us, arguing against military service, makes the following disquieting observations:

> I cannot agree that Dioscorides was certainly a physician in the Roman army. Where there seems to be a difference between you and me is the degree of certainty. My reasons for disagreement are: (1) If he had been a military physician, there would seemingly have been some emphasis on wounds — and there is not. Taking the first book of the *Materia Medica*, for example, which has the aromatics and balms, often used in wound therapy, there are only ten uses for wounds. Of the ten, only six (I, 68, 74, 84, 109, 110, and 127) are for drawing together bloody wounds. In this same book there are 39 usages in gynecology and 24 for menstruation. Knowing the American army and the trouble military physicians have with wives, it is doubtful that a Roman military physician found himself treating women. Especially this is true since Roman soldiers could not marry in the 1st century A.D. (2) The places that Dioscorides mentions in the context of personal observations are mercantile sites, and very few are military posts where legions were stationed. Dioscorides mentions specific plant habitats: 38 references are to provinces, cities, or mountains in Asia Minor, 27 to the same on the Greek mainland, 12 to Egypt, 9 to Syria, 8 Italy, 6 Arabia, 3 each to Spain, Africa, and Persia, 2 to India, 2 Armenia, and one each to Gaul, Somalia (Troglodytia), and the Red Sea. In addition he refers to plants on these islands: 9 times to Crete, 5 to Cyprus, 2 Sardinia, and one each to the Balearic Islands, Chios, Rhodes, Samothrace, Hyères Islands (off SE coast of France), and the Cyclades Islands. Moreover, in the first four books, he observes the following places as trade or manufacturing centers for particular products: 4 Petra, 4 Egypt (specifically mentioning the merchants of Alexandria) and one each for Achaea, Africa, Barbarian lands, Britain (ref. to mead), eastern Iberia, western Iberia, Palmyra, Pamphylia, and Phoenicia. I am fairly confident that the bulk came from Dioscorides'

> observations or from reports of what he was told (e.g. from India — plants like cassia and cinnamomum are poorly described anyway) and not from other literary sources. He seems to have visited Petra which he could not have done as a soldier — Nabatea was not added to the Empire until A.D. 106. With the exception of Syria, some provinces of Asia Minor, Iberia, and Gaul, all places mentioned were Senatorial provinces and not where legions were or could be stationed.
>
> What causes the most problem for my argument is the statement in the Preface that he (Dioscorides) was in the same "art" as Arius, who is known to have written medical works. This would militate against a thesis that Dioscorides was a drug dealer, but not be conclusive. But more than anything else, my opinion rests on all those visits to the islands, hardly typical places for a soldier's itinerary. It seems too much to take one word, rather unclear as to its meaning, and stretch it into a whole career biography for the man.

These objections, however, are not conclusive. The botanical and folk-medical traditions on gynecological disorders, and, in particular, menstruation, are far more widespread than any relating to the specific treatment of wounds. We do not know whether the Roman army had a standard pharmacopoeia, which seems *prima facie* unlikely, but if stationed as an army doctor in the eastern half of the Roman Empire, Dioscorides need not have employed a great range of medicaments for wounds. Besides, he is not writing a handbook on military medicine and pharmacy, but an all-embracing compendium of drugs.

Another possibility is that Dioscorides saw very little actual fighting with the troops. Professor Riddle's list of sites with which Dioscorides and his sources were acquainted shows very clearly that any military service must have taken place in the eastern provinces. The four Syrian legions especially were notoriously lax, *pace longa segnes* (Tacitus, *Annals*, XIII, 35) until the reforms of Corbulo and the war with Armenia, A.D. 55-63, and had seen very little service in the field for many years. The minor disturbances in Judea and Cilicia in A.D. 52 (Tacitus, *Annals*, XII, 54-55) were put down by the auxiliaries, not the legions, and the close proximity of the legionary bases to the delights of the eastern cities, as compared with the more inhospitable life of the legions on the Rhine and Danube, was said to have encouraged indiscipline. In Egypt many of the legionaries were often away from the camp, engaged in administrative and supervisory duties (e.g. Pap. Geneva 1). The two legions stationed there were not, in this period, involved in any fighting.

The list of places also shows that is is wrong to erect a military career for Dioscorides solely on the basis of places named, since by far the great majority never saw a Roman force, and there is no great movement of troops from one end of the Empire to the other, even at the time of the Armenian War. With the possible brief exception of leg. III Gallica, which after A.D. 63 may have seen a short period of service in the west (J.-P. Rey-Coquais, "Syrie Romaine de Pompée à Diocletien," *Journal of Roman Studies* 68 [1978]: 44-73 [67]; but cf. E. Ritterling, "Legio," *RE* 24: part 1 [Stuttgart, 1925], esp. col. 1523), no eastern legion moves west, although their disposition among the eastern frontier provinces altered slightly between A.D. 55 and 68.

This is not to say that Dioscorides could not have visited some of the western provinces or gone beyond the Roman frontier into a friendly kingdom, like the Nabatean kingdom of Petra, while on official business with the army, for centurions and other non-commissioned officers are often found carrying out administrative or diplomatic tasks, and a mission to Malichus II of Nabatea in the Armenian crisis of A.D. 54 would be very plausible, cf. Tacitus, *Annals*, XIII, 7. But direct evidence for all this is completely lacking. Until some is found, one should avoid all speculation about the military travels of Dioscorides.

Nor can one draw any sure conclusion about his tenure of service with the legions or the auxiliary troops. He clearly implies more than a brief tour of duty, but there is no means of telling whether he had served for a long while or, as is more likely, had taken what may be very loosely called a short-service commission (R.W. Davies, "The Medici of the Roman Armed Forces," *Epigraphische Studien* 8 [1969]: 83-99 [esp. 91]; cf. also Davies, "Some More Military Medici," ibid., 9 [1972]: 1-11, reviewing earlier theories). His claim to have travelled widely as a soldier may be a slight and pardonable exaggeration if his service covered some of the eastern provinces, but if, as many have done (e.g. Davies, "Medici," *Epigraphische Studien* 8 [1969]: 86), one assumes that Dioscorides had seen many different cities and regions in his military service, there is one unfortunate consequence. Despite his claims, he did not derive from his experience any worthwhile and large-scale information about plants and herbs that he could have seen outside the eastern provinces. It is kinder to Dioscorides to posit a relatively short term of service, perhaps for the Armenian War only, rather than a long period of military travels from which he derived little obvious benefit.

To sum up, Dioscorides, as Arius knew, had served in the army; his references to places strongly suggest that he had been stationed in the east, and that he or his sources had seen the other places while on private visits; and that Dioscorides' military career cannot be described for him in detail on the basis of the evidence we have. For a doctor to travel in search of patients, drugs and experience was very common (cf. Vivian Nutton, "The Chronology of Galen's Early Career," *Classical Quarterly* n.s. 23 [1973]: 158-71 [esp. 165-70]), but as Seneca, Dioscorides' contemporary, curtly put it, "Travel doesn't make a doctor" (*Epistles*, CIV, 19).

Laecanius Bassus, consul in A.D. 64, a member of a wealthy consular family with estates in Istria, is not known to have any other eastern connections, although an official post in the province of Syria (which in Dioscorides' day included the southeastern part of the plain of Cilicia) to do with the Armenian War cannot be excluded. Arius, like the Lucius recorded half a century later on an inscription from Cilician Castabala (*ILS*, 1050), could well have been the personal doctor to the Roman official. It is somewhat ironic that Bassus should have died from a general infection after he had attempted to remove a boil from himself; see Pliny, *Natural History*, XXVI, 5, with the comments of the Loeb editor, W.H.S. Jones, and his friend, A.C. Andrews.

Preface 5

pharmacology is the translation of ὁ περὶ φαρμάκων λόγος, which seems justified from Dioscorides' objectives in identifying the drugs derived from specific plants (the modern "pharmacognosy"), preparation, storage, and to some extent the packaging of drugs (all under the modern rubric of "pharmacy"); and Dioscorides is quite informative about how drugs act (the modern "pharmacodynamics"), about poisonous materials (toxicology), and — most important — how drugs are used in therapy (the modern "pharmacotherapeutics"). "Pharmacology" is the best choice in modern English to describe the composite of details included by Dioscorides, as well as his stated objectives. In some respects, his manner of classification of drugs is similar to what is termed "pharmacological pharmacognosy," a modern method of classification that groups drugs according to the pharmacological action of their most important constituent, or according to their employment in therapeutics. See Trease and Evans, *Pharmacognosy*, p.5.

. . . trials on patients: τοὺς ἐπὶ τῶν παθῶν πειρασμούς, which clearly means that the drugs will be used against specific ailments to see whether or not they would be beneficial. Since this phrase is most unusual, one may speculate if Dioscorides is speaking for his own method of "drug testing" or whether it was assumed as typical, much as folk medicine might have assumed such a "method" of drug therapy (cf. Theophrastus, *Historia Plantarum*, IX). See also commentary on *Preface* 1 above (. . . preparation, properties, and testing of drugs).

Preface 6

. . . sites are important: Cf. Theophrastus, *De causis plantarum*, VI, 13. 3-5 (ed. F. Wimmer, *Theophrasti Eresii Opera omnia* [Paris, 1866; rptd. Frankfurt, 1964] 308-09). Dioscorides is not here concerned with the theoretical causes of plant growth (*De causis plantarum*, VI, 13. 2 [ed. Wimmer, p. 308]), which Theophrastus attributes to "particular mixture (*krasis*) and Nature (*physis*) creating differences." Although there are a number of 'traces' of Theophrastus in Dioscorides' work (Stadler, "Theophrast und Dioscorides," *Festschrift Wilhelm von Christ* [Munich, 1891] 176-87), Dioscorides has little patience for pure theory, but rather intends to state explicitly where the best kinds of sites might be for the herbs, without bothering with any underlying philosophical theory. See O. Regenbogen, "Theophrastos" (3), *RE*, Supplementband VII (Stuttgart, 1940) cols. 1354-562 [esp. 1447-48].

weakness: Dioscorides' term here is reflective of a long tradition in botanical and agricultural lore, about how plants age and die. Much of this appears in fairly polished form in Theophrastus, *De causis plantarum*, V, 11. 1 (ed. Wimmer, p. 280 [old age and the accompanying weakness]), and V, 8 and 10 (ed. Wimmer, pp. 275-76, and 278-80 [diseases of trees and fruits]).

Preface 7, passim: one can find many of the same admonitions in modern botany texts and the better guides to flowers.

dog's tooth grass (ὁ ἄγρωστις): *Cynodon dactylon* (L.) Pers., known more commonly as "Bermuda Grass," is now widely distributed throughout the southern United States (in various hybrids) as lawn grass. Apparently originating either in north Africa or India, *C. dactylon* has been cultivated since antiquity as fodder for livestock, since it makes excellent hay. The short description in Dioscorides, IV, 29 (ed. Wellmann, 2: 192) is generally accurate, and one reads of "leaves that are sharp, hard and flat, like a small reed, which feed cattle and sheep," well illustrated in the Vienna Codex (fol. 38^{v}). Dioscorides says that one beats the root into a paste for application on wounds, thereby sealing them, and a concoction (of the root paste?) is effective against bladder stones. The "dog's tooth grass" in Theocritus, XIII, 42, is an allusion to the plant as mentioned in Homer's *Odyssey*, VI, 89, which (according to Aeschrion in Athenaeus, *Deipnosophistae*, VII, 296e) conferred immortality on Glaucus (A.S.F. Gow, *Theocritus*, 2nd ed. [Cambridge, 1952; 2 vols] 2: 239 comm. on XIII, 42), so the grass had a long history of purported benefit. Galen, *Mixtures and Properties of Simples*, VI, 1. 3 (ed. Kühn, XI, 810-11) expands the medical details of "Bermuda Grass" by gathering information on it, not only from Dioscorides, but also from Sextius Niger, Pamphilus, Archigenes, Heraclides, Crateuas, and others.

coltsfoot (τὸ βήχιον) indeed requires observation throughout the growing year, since it has an unusual cycle of development. *Tussilago farfara* L. (the only species in the genus *Tussilago* of the Compositae), a perennial, first produces a flowering stem (in February in England, somewhat later in March on the continent) which is a solitary, thick, and scaly, single peduncle with many reddish bracts and whitish hairs bearing a single composite flower, 1.5-3.5 cm. in diameter. Soon the flower begins to wither, and neighboring shoots produce leaves, which are basal, large, and stalked, with blades that are orbicular-heart shaped edged by wide, irregular shallow lobes (the leaves measure from 10 to 30 cm. across); the leaves are collected by herbalists in June and July, while they gather the flowers and flower-stalks in February and March. The leaf shoots, in turn, die down and the cycle begins again in late November, with the initial growth of the flowering stem. The coltsfoot is an unusual example of a medicinal plant that was smoked in classical antiquity for its pharmaceutical

benefits, as Dioscorides, III, 112. 2 (ed. Wellmann, 2: 124) writes, "the dried leaves [of the coltsfoot] are slowly charred [to make them smoke] and the smoke cures those who suffer from coughing and difficult breathing when they open their mouths wide and inhale the smoke through a fumigation-funnel." He adds that the root of the plant, when charred and drunk with hydromel, expels a dead fetus. Pliny's version of the "pipe" has the roots being charred on cypress-wood coals, and the smoke inhaled to treat chronic cough (Pliny, *Natural History*, XXIV, 135: Radix eius inponitur carbonibus cupressi, atque is nidor per infundibulum bibitur inveteratae tussi). Pliny's description of coltsfoot (*Natural History*, XXVI, 30, taken, so Wellmann argued [ed. Dioscorides, 2: 123, 15 apparatus criticus] from Sextius Niger) suggests why Dioscorides was criticising Niger in particular: Dioscorides clearly distinguishes the two stages of the coltsfoot's growth cycle (III, 112. 1), while Pliny (using Niger) says that there are two kinds, and that the plant has "no stem, no flower, no seed." Galen's account of coltsfoot (*Mixtures and Properties of Simples*, VI, 2. 7 [ed. Kühn, XI, 850-51]) seems derived from Dioscorides rather than directly from Niger, but parallel versions in Dioscorides, III, 112. 2, and Pliny, XXIV, 135 (from Iollas of Bithynia) may suggest that Galen took part of his data from Dioscorides and part from Iollas. The dried leaves of *Tussilago farfara* contain pectin, a bitter glucoside, some tannin, a volatile oil, resin, saponin, and caoutchouc, which ensure that the 'Tussilaginis Folium' (*BPC* 1934, as well as the Swiss, German, Austrian, and Portuguese pharmacopoeias) would be an excellent demulcent, expectorant, and tonic. Modern herbal medicine still recommends coltsfoot leaf as part of an herbal 'tobacco,' for the relief of asthma, catarrh, and various lung troubles. See M. Grieve, *A Modern Herbal* (New York, 1931; rptd. 1971; 2 vols.), 1: 213; Juliette de Baïracli Levy, *Herbal Handbook for Farm and Stable*, 2nd ed., rev. (London, 1973) 52; and Malcolm Stuart, *Encyclopedia of Herbs and Herbalism* (London, 1979) 275-76.

cinquefoil (τὸ πεντάφυλλον), probably *Potentilla reptans* L., the "creeping cinquefoil," is another of those 'tricky' plants that amateur botanists might think would have no 'stem' *per se*. *P. reptans* is a creeping plant that produces large yellow flowers (1.5-2.5 cm. across), rooting at nodes and bearing flowers as solitary and axillary on long, slender stalks. Theophrastus, *Historia Plantarum*, IX, 13. 5, is the first extant source in Greek to record the cinquefoil as an herb, and the plant enjoyed a long popularity in

Greco-Roman pharmacology. The Hippocratic *Diseases*, II, 42 (ed. E. Littré, 7: 58) recommends its use against tertian fever, and the Hippocratic *Wounds*, 20 (ed. Littré, 6: 424) includes two varieties of *Potentilla* to be applied under bandages in the treatment of wounds and ulcers (probably *P. reptans* as well as *P. argentea* L.). Nicander, *Theriaca*, 839, prescribes cinquefoil (here πεντα-πέτηλον) as part of an antidote against insect bites and stings (Scarborough, "Nicander's Toxicology, II," *Pharmacy in History* 21 [1979]: 80-81), indicating the incompetence of this poet who compiled earlier toxicological data. Galen, *Mixtures and Properties of Simples*, VIII, 8 (ed. Kühn, XII, 96) notes that cinquefoil would not be useful in treatment of poisoning, an opinion confirmed by modern pharmacology, which has determined the astringent qualities of cinquefoil result from a high concentration of tannin (not less than 15%). Dioscorides, IV, 42 (ed. Wellmann, 2: 199-202) has the botanical description right, and lists a number of benefits of cinquefoil: the root, held in the mouth, reduces the discomfort of toothache (IV, 42. 2) and helps heal mouth sores; if made into a gargle it soothes the windpipe; and it is useful for sciatic pains and arthritis. *Potentilla* is no longer part of the pharmacopoeia in the United States, but *P. recta* remains an official drug in several European countries as Tormentil Rhizome, used as a tincture and internally and externally as an astringent.

plants keep: Theophrastus, *Historia Plantarum*, IX, 14. 1, says that "hellebore" (not distinguished) keeps its vitality for up to thirty years, along with other drugs variously listed with lesser life in storage, except for the squirting cucumber, which (so Theophrastus has been told) retains its usefulness for over 200 years. Pliny, *Natural History*, XXVII, 143, while recording some of the numbers in Theophrastus' account, wisely writes, "In sum, I do not think it amiss to warn that all their properties vary with age." Only with white and black hellebore does Dioscorides provide 'exact' figures.

white hellebore: *Veratrum album* L. First described by Theophrastus, *Historia Plantarum*, IX, 10. 1-3, but very tersely (Scarborough, "Theophrastus," *Journal of the History of Biology* 11 [1978]: 361), suggesting that the plant was not widely used or well understood by Greek rootcutters in the 4th century B.C. By contrast, Dioscorides has a lengthy description in *Materia Medica*, IV. 148 (ed. Wellmann, 2: 290-92). Pliny's account of white hellebore is

drawn from Sextius Niger (*Natural History*, XXV, 48-61 [white and black intermixed]), and is consequently muddled. Dioscorides provides an unfortunately vague description of the plant, choosing to compare it to a wild beet and some sort of plantain. The "plantain-like" leaves are, in some respects, like those of the smaller, common plantain, but white hellebore has leaves that are less severely veined. The identity of Dioscorides' "white hellebore," however, is aided by the illumination in the Vienna Codex (fol. 113^{v}), which shows the shape of the plant and distribution of leaves in a correct fashion. Dioscorides is quite right in stating that the white hellebore "grows in mountainous regions" (IV, 148. 1). Although white hellebore is strikingly poisonous, Dioscorides recommends it as an emetic, as an ingredient in *collyria* that rid the eyelids of blemishes, as an emmenagogue, as an agent which applied will expel a dead fetus, as a sternutatory (presumably in powdered form), and — curiously — as a mouse poison, combined with honey and barley-meal and bits of meat (one wonders if a mouse would even nibble at this bait) (IV, 148. 2). A powerful alkaloid, veratridine (3-Veratroylveracevine) has been isolated from the root of *V. album*, and is used occasionally in veterinary medicine as part of what is called Veratrine Mixture as an emetic for pigs and as a ruminatoric for cattle. 'White veratrum' appears in the 1934 British Pharmaceutical Codex, and remains in the pharmacopoeias of Germany, Switzerland, and several other European countries; 'White veratrum' was formerly used as a cardiac depressant (viz. the dried rhizome and roots of *V. alba*), but is now employed only as a source of the alkaloid protoveratrines A and B.

black hellebore: This is the infamous *Helleborus niger* L., sometimes called the Christmas rose (it is possible that Dioscorides' "black hellebore" is *H. cyclophyllus* Boiss., fairly common in the Balkans, but flower size and carpel structure are determinative, and these are impossible to specify from Greco-Roman descriptions; probably Dioscorides and his sources lumped the species together). Dioscorides' description of the black hellebore has green to black leaves, white flowers, and skimpy, thin black roots that dangle from a small onion-like swelling (*Materia Medica*, IV, 162. 1 [ed. Wellmann, 2: 307]). This is essentially correct, except that the rootstock does not appear round, but rather cylindrical and irregular (clearly, the artist who has rendered the figure of "black hellebore" in the Vienna Codex, fol. 114^{v}, has done so from the

purported description; the "black hellebore" in the Vienna Codex is almost completely fabricated, and the artist had never seen the plant, an opinion made certain by the "ball" pictured as the rootstock). Its basic use in Greco-Roman pharmacy was as a drastic purge (parallel sources in Wellmann ed., 2: 306-08 apparatus criticus). At the conclusion of his entry on black hellebore, Dioscorides records what must have been a colorful and deep-seated superstition concerning the digging of hellebore (in Egypt?). He says that a hellebore-wine is sprinkled about dwellings, with the assumption that this would bring protection against harmful spirits. Moreover when digging the hellebore, the natives said that praying to both Apollo and Asclepius was essential, and that one had to keep a sharp eye out for eagles in flight, since if an eagle saw someone digging up a hellebore, that person died. So the deed was done quickly. As a kind of afterthought, Dioscorides adds that hellebore-diggers eat garlic and drink wine as prophylactics against harm (IV, 162. 4 [ed. Wellmann, 2: 308-09]). *H. niger* and related species contain at least three glycosides, one of which is called hellebrin that has a strophantin-like action, used as a cardiac stimulant in the recent past. Quite poisonous, *H. niger* is a powerful and very dangerous hydrogogue and emmenagogue. Overdoses cause violent inflammation of the gastric and intestinal mucosa, with equally violent purging and vomiting. *H. niger* remains on none of the modern pharmaceutical listings, and plays little role in modern herbal medicine. See Trease and Evans, *Pharmacognosy*, p. 506.

French lavender (στοιχάς) or cassidony (*Lavandula staecas* L.) receives a very brief entry in Dioscorides, III, 26 (ed. Wellmann, 2: 36-37), and were it not for the splendid illumination of the plant in the Vienna Codex (fol. 319^{v}), one would be very uncertain of its identity. One clue is Dioscorides' "locale" (islands near Massilia, probably the present Rateneau and Pomègues Islands, off the coast of Marseilles). Had there been any mention of purple flowers and spikes, and a shrub-like appearance, identification might be more assured from the text alone. Pliny, *Natural History*, XXVII, 131, basically reproduces Dioscorides' short account (although Wellmann, 2: 36 apparatus criticus 14, notes that Pliny's text is derived from Sextius Niger and Crateuas — and thus so is Dioscorides). Scribonius Largus, *Conpositiones*, 177 (ed. Helmreich, p. 72: the "Antidote of Marcianus, the Physician") includes a mention of *L. staecas* in a multi-ingredient recipe, and

Galen, *Antidotes*, I, 14 (ed. Kühn, XIV, 76) notes that the plant is widespread. Its use, according to Dioscorides, is for "chest complaints." Formerly used for a variety of ailments, the dried flowers, dried leaves, and dried flowering plant are now used in the herbal medicine of southern Europe as a mild sedative, antiseptic, and remedy for nausea and vomiting. See Levy, *Herbal Handbook*, p. 81; Stuart, *Herbs*, p. 212; and Hans Flück, *Medicinal Plants*, trans. from the German by J.M. Rowson (London, 1976), p. 125.

wall germander, felty germander (χαμαίδρυς, πόλιον) are two species inthe genus *Teucrium*, viz. *T. chamaedrys* L., and *T. polium* L. of the Labiatae, a large family of flowering plants most know as "Mints." The plant χαμαίδρυς in Dioscorides, III, 98 (ed. Wellmann, 2: 110-11) is described as growing in rugged, rocky places, small and shrub-like, having leaves small and toothed like those of an oak, and with a small flower of pale or light purple. This is almost certainly *T. chamaedrys*, which is low and shrubby, a tufted perennial of 10 to 30 cm., which bears flowers that vary in color from pink to purple, and which can be simply pinkish-purple. Its leaves are toothed, similar to the bracts, and the leaves (1 to 3 cm.) are broadly oval, deeply round-toothed and have a quasi-leathery appearance, like some species in *Quercus* (oaks). Dioscorides (III, 98) adds that this plant has to be gathered when the seeds are mature. He writes that medical uses for *T. chamaedrys* are varied: taken with water, the wall germander is useful against convulsions, coughs, troubled spleens, and irregular urination; drunk with vinegar the germander is an even better treatment for the spleen. Πόλιον is probably *T. polium*, given the description in Dioscorides, III, 110 (ed. Wellmann, 2: 121-22), which carefully distinguishes its white stems and grayish fuzziness. Known as the felty germander, or hulwort, *T. polium* is a small branched shrublet (5 to 40 cm.) of white or gray-felted stems and leaves with compacted globular terminal heads of flowers that can be pink, white, and sometimes yellow (Dioscorides has "small head at the top"). Χαμαίδρυς (*T. chamaedrys*) appears in Theophrastus, *Historia Plantarum*, IX, 9. 5, where the plant is used (leaves pounded in olive oil) in the treatment of wounds and fractures, and perhaps for what modern medicine calls neoplasms of the skin (the Greek is literally "spreading sores"). Pliny's account (*Natural History*, XXIV, 130; from Sextius Niger [Wellmann ed., *Materia Medica* 2: 110 apparatus criticus 7]) of the wall germander resembles that of Dioscorides, suggesting that both Dioscorides and Pliny have

extracted Niger. Galen, *Mixtures and Properties of Simples*, VIII, 22. 2 (ed. Kühn, XII, 153) notes the sharp and bitter qualities of the wall germander, and says that the Italian variety is just as effective as that from Crete (*Antidotes*, I, 12 [ed. Kühn, XIV, 59]). Πόλιον seems to be the 'preferred' kind in herbal lore, since one finds it mentioned by Theophrastus, *Historia Plantarum*, I, 10. 4, II, 8. 3 (in the consideration of insect-galls on plants), and VII, 10. 5 (where the felty germander is cited as illustrative of the difficulty in taxonomy of herbs, experienced by Theophrastus), as well as Apollodorus in Nicander, *Theriaca*, 64 and 583. All species of *Teucrium* contain high concentrations of tannin, bitter principles including picropulin, and at least two sugars (stachyose and raffinose). *T. scordium* L., the water germander (or 'English treacle' or wood garlic), has a high concentration of scordein, as well as tannin, which gives the fresh herb a garlicky odor and a bitter, sharp taste. Modern herbal medicine uses the germander (esp. *T. chamaedrys*) as a tonic, choleretic, antiseptic, and diuretic; an infusion of the plant aids the appetite and digestion, and eases flatulence.

wormwoods (ἀβρότονον, σέριφον, ἀψίνθιον): Here in *Preface* 8, Dioscorides mentions three varieties, but in the lengthy description of wormwoods (III, 23-24 [ed. Wellmann, 2: 30-35]) there are four kinds, possibly five. It appears that Dioscorides was aware that there were numerous types of "absinthe," but that he and his sources never could decide on the exact taxonomy to differentiate them. From the standpoint of the Greco-Roman pharmacologist, such precise taxonomy would not have made much difference, since almost all species have similar pharmacological properties, much as Dioscorides writes of his "Santonica wormwood" (probably from Gaul) which has similar properties as the σέριφον (III, 23. 6 [ed. Wellmann, 2: 33]). Ἀβρότονον receives a section of its own (III, 24 [ed. Wellmann, 2: 33-35]), and is either *Artemisia arborescens* L., the shrubby wormwood, or *A. abrotanum* L., commonly known as southernwood, or lad's love. Both species more-or-less fit Dioscorides' description, with a greater probability that *A. abrotanum* is the particular plant, since Dioscorides tells us that it grows in Cappadocia, Galatia "in Asia," and "Hierapolis in Syria" (III, 24. 2 [ed. Wellmann, 2: 34]); all three are inland locales, which would favor *A. abrotanum*. But in III, 24. 1, after describing the plant as being like σέριφον (as opposed to the ἕτερον, ὅ ἄρρεν which is like ἀψίνθιον), Dioscorides writes that "this one seems to be more like

the one of Sicily," which would lend weight to the identity being *A. arborescens.* Most likely, the two species have been conflated. Σέριφον is probably *A. campestris* L. subsp. *maritima* (Lloyd) Archangeli, the "sea wormwood" rather common throughout the Mediterranean littoral. In III, 23. 5, Dioscorides says that σέριφον grows in the Taurus range in Cappadocia (which would not fit the living habits of *A. maritima*) as well as at Taphosiris in Egypt, about 25 miles west of Alexandria (which would be appropriate for *A. maritima*). It is possible that Dioscorides means to call attention to the resemblance between his "third kind of absinthe, which grows in the Alps of Gaul, called Santonicus from the land of the Santones" (III, 23. 6) and the absinthe which grows in the mountains of Cappadocia; if so, the species is probably *A. genipi* Weber (*A. spicata* Wulfen), a mountain wormwood. Ἀψίνθιον is wormwood (*A. absinthium* L.), sometimes called green ginger or simply absinthe.

The various species of wormwood had great popularity in Greco-Roman pharmacy (parallel passages listed in Wellmann's apparatus criticus, 2: 30-35, with two direct testimonia from Galen) for the many uses that Dioscorides enumerates: a diuretic, against stomachaches (taken with nard), mushroom poisoning (taken with vinegar), hemlock, and mousebite; smoked (leaves?) were used for earaches, and made into plasters were beneficial for sore eyes; added to wine (particularly in Thrace and around the Hellespont), absinthe was employed as a general insect-repellent (leaves[?] keep moths[?] from eating stored clothes, and applied with oil to the body repel mosquitoes and gnats); ink made with absinthe keeps mice from eating writing papyrus; taken with honey, absinthe is an excellent anthelmintic; spreading smoking absinthe (leaves?) keeps snakes away, etc., etc. Almost all species of *Artemisia* contain absinthin, a dimeric guaianolide with two lactone rings and two hydroxyl groups per molecule; the dark green or brown volatile oil is made up mostly of thujone (J.L. Simonsen, *The Terpenes* [Cambridge, 1949] 2: 32-52; and E. Guenther, *The Essential Oils* [New York, 1952] 5: 487). This chemistry ensures the well-known strong odor and very acrid taste, and would lend reliability to the most common use made of absinthe, flavoring in alcoholic beverages, especially vermouth. Modern preparation of the essential oil is by steam distillation from the dried leaves and tops, esp. of *A. absinthium* (Hill, *Economic Botany*, p. 257). Greek and Roman pharmacologists had noted that wormwood was effective as a vermifuge, and the drug santonin, a

crystalline lactone, remains in most modern official drug lists (except U.S.) as a treatment for roundworms (it does not affect tapeworms); side effects, however — including the headaches mentioned by Dioscorides — have generally eliminated the use of santonin in favor of more reliable vermifuges.

marjoram: see n. 32 to the Introduction above.

Preface 9

infusion (χυλίζειν): Dioscorides probably means both infusion and decoction in this passage, although clearly he intends "decoction" specifically in *Materia Medica*, II, 86. 1 (ed. Wellmann, 1: 170) with χύλωσις (the process of decoction) and χυλός in *Simples*, I, 55 (ed. Wellmann, 3: 172), the product of decoction. A decoction is that which is obtained from an herb by boiling it down to gain what herbalists call an 'essence,' or the 'liquor' of the plant; usually a specific weight of plant matter is boiled in a given volume of water. Infusion is familiar to anyone who has prepared tea, since this process consists of pouring a given volume of boiling water over a specific weight of the herb, and 'infusing' (=steeping) it for a time to extract the herb's soluble constituents.

limewood (φιλύρινος) is either *Tilia rubra* DC, or *T. platyphyllos* Scop., the large-leaved lime tree.

boxwood (πύξος) is *Buxus sempervirens* L.

juniper-oil was obtained from either *Juniperus excelsa* Bieb., the Greek juniper, or from *J. drupacea* Labill., the Syrian juniper (both as ἡ κεδρία in Greek).

Department of History
and College of Pharmacy
University of Kentucky
Lexington, Kentucky 40506

and

Wellcome Institute for the
History of Medicine
183 Euston Road
London NW1 2BP, Great Britain

A Note on the Autopsy of Oliver Cromwell

SAUL JARCHO

IN the last issue of *Transactions & Studies* Dr. Leonard Bruce-Chwatt, the eminent malariologist, described the life, sicknesses, and death of Oliver Cromwell (1599-1658).[1] Combining historical research, epidemiological expertness, and common sense, Dr. Bruce-Chwatt reached the sound conclusion that Cromwell, a long-term resident of a malarious district in Cambridgeshire, had suffered from malaria (and several other diseases) but had died of urinary-tract infection consequent on urolithiasis.

Among the most interesting passages in Dr. Bruce-Chwatt's discussion is the report of Cromwell's autopsy. The text appears in a historico-political treatise, George Bate's *Elenchi Motuum Nuperorum in Anglia Pars Prima; Simul ac Juris Regii & Parlamentarii Brevis Enarratio*, London, Flesher, 1661, pars secunda, p. 417 [italics in original]:[2]

> Dissecto cadavere in *Animalibus* partibus vasa cerebri justo pleniora videbantur; in *Vitalibus* pulmones aliquantisper inflammati; sed in *Naturalibus* fons mali comparauit: *Liene*, licet ad aspectum sano, intus tamen tabo instar amurcae referto. [At this point the edition of 1663 intercalates: Nec id morbo qui a longo tempore infestârat incongruum, quippe de Hypochondriaco affectu annos triginta plùs minus per vices gravissime queritâsset.] Corpus etsi exenteratum, aromate repletum, ceratisque sextuplicibus involutum, loculo primum plumbeo, dein ligneo fortique includeretur, obstacula tamen universa, perrumpente fermento, totas perflavit aedes adeo tetra mephiti, ut ante solemnes exsequias terrae mandari necessarium fuerit.
>
> When the body was dissected, in the *animal* structures the cerebral vessels appeared unduly full; in the *vital* structures the lungs were somewhat inflamed; but in the *natural* structures the source of the illness was apparent, for the *spleen*, although healthy in external appearance, was

1. L. Bruce-Chwatt, "Oliver Cromwell's Medical History," *Transactions & Studies of the College of Physicians of Philadelphia*, ser. 5, 4 (June 1982): 98-121.

2. Not having ready access to this edition, I am content to copy Dr. Bruce-Chwatt's quotation. The edition of 1663, which I have consulted in the library of the New York Academy of Medicine, omits some of the stronger necrological details, which are important in the present discussion.

> filled internally with corrupt matter resembling lees. [In edition of 1663: This was not incompatible with the sickness that troubled him for a long while, because from time to time for thirty years, more or less, he had complained of the hypochondrial affection in very severe form.] Although the body was eviscerated, wrapped in sixfold cerements, and placed first in a leaden coffin and then in a stout wooden one, the ferment broke through and overcame all barriers. It permeated the entire building with a stench so foul that the body had to be buried before the religious service.[3]

Presumably the autopsy was performed because the patient had been chief of state; this assumption is supported by numerous royal, papal, and episcopal analogies. The concise report, almost as vigorous as a tract by Defoe or Swift, reveals an interesting collection of traits.

The medical reader will note at once the categories used in describing the organs. He mentions first the *animal parts*, by which he means the brain, then the *vital parts*, which are the lungs, and finally the *natural parts*, here represented by the abdominal viscera. These ascriptions of function follow the second-century doctrines of Galen,[4] who recognized three faculties: the animal, which emanated from the brain and passed through the nerves; the vital, which passed from the heart through the arteries; and the natural, which passed from the liver through veins. These were characterized respectively as *pneuma psychikon* (or *spiritus animalis*), *pneuma zotikon* (*spiritus vitalis*), and *pneuma physikon* (*spiritus naturalis*).

Coincidentally the autopsy report follows the ancient head-to-feet arrangement, known in Latin as *a capite ad calcem*. This order continued to be used in the eighteenth century, as can be seen in Morgagni's great *De Sedibus*, and it is to be found as far in the past as the Edwin Smith papyrus, ca. 1600 B.C.

3. Translation by S.J.

4. See *Claudii* [sic] *Galeni Opera Omnia*, edited by C.G. Kühn (Leipzig: 1821-1833) 14:726, 8:233, 5:608, and 11:731; these refer respectively to Galen's *Introductio seu Medicus*, chap. 13; *De Locis Affectis*, book 4, chap. 3; *De Hippocratis et Platonis Decretis*, book 5, chap. 3; and *De Simplicium Medicamentorum Temperamentis*, book 5, chap. 9.

Convenient introductions to Galenic doctrine are to be found in F.H. Garrison, *An Introduction to the History of Medicine*, 4th ed. (Philadelphia: 1929) 113-114 and Galen, *On the Natural Faculties*, with transl. by A.J. Brock, Loeb Classical Library (London: Heinemann, 1916) esp. xxv. See also R.F. Kotrc and K.R. Walters, "A Bibliography of the Galenic Corpus," *Transactions and Studies of the College of Physicians of Philadelphia*, ser. 5, 1 (1979): 256-304.

To a twentieth-century reader the only important anatomical finding is the semiliquid character of the splenic pulp, which might be attributed partly to infection and partly to postmortem autolysis. The seventeenth-century physician, recognizing the importance of the observation, referred to the diseased spleen as *fons mali*, the source of the illness, and understood that it was related to Cromwell's protracted abdominal symptoms. As Dr. Bruce-Chwatt points out, the spleen was not found enlarged.

Also to be noted is the remark that the *ferment* which emanated from the cadaver permeated the building with a foul stench. The use of the term "ferment" is a clear reference to seventeenth-century iatrochemical doctrine, of which the classical exposition is Thomas Willis' *De Fermentatione*,[5] published in 1659, the year following the Protector's death. Willis had been evolving the concept for at least a decade. As Dewhurst has stated in his recent edition of Willis' casebook,[6] ". . . fermentation theory dominated Willis' physiology and pathology: he believed that a specific ferment in the heart was responsible for propelling blood through the arteries, and other organs had similar ferments regulating their function . . . and fevers resulted from an abnormal fermentation in the blood."

A minor historical irony inheres in the fact that Willis, whose doctrines were applied in the final report on the Protector, was a lifelong supporter of the royal house and an ex-soldier in the royalist army.

It remains to comment briefly on George Bate (1608-1669), author of the book in which Cromwell's autopsy protocol was published. According to the *Dictionary of National Biography* "he was at first thought a puritan, but on the establishment of the court at Oxford attached himself to the royal party, and was made physician to the king . . . and during the interregnum became physician to Oliver Cromwell. The Restoration found him a royalist again."

5. T. Willis, *Diatribae duae medico-philosophicae quarum prior agit de fermentatione* (London: 1659). I have used the edition included in Willis' *Opera Omnia* (Lyons: 1681) 1:1-62.

6. K. Dewhurst, *Willis's Oxford Casebook (1650-52)* (Oxford: Sandford Publications, 1981) 25.

Bate is remembered for his participation in the authorship of Glisson's famous *De Rachitide* (1650) and for his authorship — sole or collaborative — of the *Pharmacopoeia Bateana*, which appeared in numerous editions and translations from 1688 at least until 1776. A pharmaceutical preparation credited to Bate was mentioned by one of Morgagni's correspondents in 1740.[7]

11 West 69th Street
New York, New York 10023

7. Giambattista Morgagni, *Consulti Medici*, edited by E. Benassi (Bologna: Cappelli, 1935) 120, n. 1. A translation of this volume is now approaching completion.

Anita K. Bahn, 1920-1980

ROBERT L. LEOPOLD, M.D.

ANITA K. Bahn, Sc.D., M.D., a greatly respected fellow and friend of the College of Physicians of Philadelphia, died on July 16, 1980, while at work in the Center for Epidemiology, School of Medicine, University of Pennsylvania.

Dr. Bahn received her baccalaureate degree at Hunter College in 1939, majoring in biological science, and her master's degree in 1940 at Cornell University. In 1948 she was awarded the first tuition training grant for non-commissioned personnel by the United States Public Health Service. In 1960 she earned a doctor of science degree in biostatistics, epidemiology, and mental hygiene at the Johns Hopkins University School of Hygiene and Public Health. She received her M.D. at the Medical College of Pennsylvania in 1972.

Beginning in 1942 Dr. Bahn served as epidemiologist-statistician in various federal government agencies. Between 1948 and 1951, while working with Dr. Harold F. Dorn at the National Cancer Institute, she developed a pilot system for the reporting and registration of cancer in four Maryland counties. Between 1951 and 1966 she was Chief, Out-Patient Studies Section, and Chief, Register Development and Studies Section, Office of Biometry, National Institute of Mental Health. While there, with the aid of a multidisciplinary national advisory committee she organized epidemiological data from outpatient psychiatric clinics.

In connection with being an established authority in her field, Dr. Bahn felt her work would be even more valuable were she to study medicine. While a medical student at the Medical College of Pennsylvania, she served first as Associate Professor of Biostatistics in the Department of Preventive Medicine, then as Deputy Chairman, and finally as Acting Chairman of the Department for the Expansion of Training in Epidemiology and Biostatistics. She also wrote two texts, *Basic Medical Statistics* and *Epidemiology: An Introductory Text.*

Dr. Bahn came to the University of Pennsylvania in 1974 as Professor of Epidemiology in the Department of Community Medicine. She was subsequently appointed Director of the Epidemiology Statistics Unit of the University's Cancer Center and senior epidemiologist with the Institute for Cancer Research at Fox Chase Cancer Center. During her years at the University of Pennsylvania she was a major force in the development of graduate training in epidemiology.

In addition to her two texts, she wrote eight monographs and about a hundred articles on various research topics and on methods of teaching. She had an international reputation as a statistician and epidemiologist. She was Honorary Fellow of the American Statistical Association and a member of the International Epidemiological Association. In 1964 she received the Certificate of Honorable Mention, Hofheimer Prize, of the American Psychiatric Association for published work selected as outstanding research accomplishment in psychiatry.

This recounting of Dr. Bahn's accomplishments suggests, but does not totally indicate, her worth as a person. She was a devoted mother, and is survived by a son, a daughter, two grandchildren, and a husband, Milton Rothman. For all of her significant contributions to the field of research, she was first a teacher. Her greatest joy was to work with students and colleagues. She had great success in presenting to them in an orderly and understanding fashion the mysteries of statistics and epidemiology. In her work she combined in the highest degree the traditions of teaching and research.

Her memory and contributions will be fresh in the minds of her students and the beneficiaries of her research.

John Porter Scott
1893-1982

JEAN A. CORTNER, M.D.

JOHN Porter Scott graduated from the School of Medicine of the University of Pennsylvania in 1919. He then interned at Presbyterian Hospital and performed his pediatric residency at the Children's Hospital of Philadelphia, where he was Chief Resident. For the next fifty-five years he practiced pediatrics.

Some of his many accomplishments during this time included the starting of the first well-baby clinic in Philadelphia in the 1920's and planning for the first foster home in Philadelphia. In addition to his practice at the Children's Hospital of Philadelphia, he was head of the Department of Pediatrics at the Presbyterian Hospital from 1929 to 1965, Professor of Pediatrics at the University of Pennsylvania, and Chairman of Pediatrics in the Graduate School of Medicine at the University of Pennsylvania from 1940 to 1959. He was editor of the *Lippincott Digest* on the treatment of pediatric disease, and author of many articles in pediatric journals describing his keen observations. He was chairman of the Section on Pediatrics of the Pennsylvania Medical Society in 1930. In 1980 the College of Physicians recorded his fiftieth year of membership.

He received several honors from the Children's Hospital of Philadelphia, where he had practiced and taught pediatrics those many years. On one of these occasions, in 1959, he remarked, "I have lived in one of the most fascinating periods of medicine." He went on to challenge the young physicians and students to "read, study, learn to observe children carefully and be attentive to the feelings of parents. Put yourself in the place of the parents. Observation is very important. Don't depend only on lab work." All of this is still very good advice; moreover, Dr. Scott practiced what he preached. He was the prototype of the caring pediatrician, and both his patients and their parents loved him.

He was the doctors' family pediatrician, honored by the confidence of his peers. His office was said to become impassible with gifts each Christmas season.

He made house calls regularly. Libby Rose once told me of coming upon him, black bag in hand, trudging through six inches of snow in a blinding storm in Wynnewood.

He was considerate toward everyone and was loved by all kinds of people. I am told that he spoke to everyone and they to him as he

walked through the halls of the Children's Hospital, rode on the elevator, ate in the cafeteria, and attended his patients on the wards and in the clinics.

He was always a gentleman. Even after losing much of his sight, he would always insist on accompanying visitors to their automobile after each visit to the Scott's home.

He had lived a full life, and has left behind a kind of immortality on earth in the form of many students, physicians in training, colleagues, nurses, patients, parents, and other people who were profoundly influenced by this gentle, loving pediatrician.

Henry L. Bockus
1894-1982

HENRY J. TUMEN, M.D.

AS the result of a tragic accident, Dr. Henry L. Bockus died on April 3, 1982. His career was one that has rarely been equalled in the medical history of Philadelphia. Dr. Bockus was not only a wise and skilled physician. He was also a superb teacher, a dynamic medical leader, a pioneer in developing gastroenterology as a major specialty, a gifted medical writer, and a great ambassador of the United States, one who fostered friendship and admiration for this country in many parts of the world. Above all, Dr. Bockus was a sturdy, sincere, and intelligent man; one who inspired in countless students, and in all who shared his efforts, a sense of purpose, a dedication to honest work, an understanding of the beauty of well-directed effort. He combined to an unusual degree scientific knowledge, clarity of thought, and human understanding. His vision was always directed to the future, and though he had a long life it can still be said of him that he died in his prime.

Henry L. Bockus was born in Newark, Delaware on April 18, 1894. He was graduated from Old Central High School of Philadelphia in the years when that school with its outstanding faculty granted a degree and met the highest educational standards. A member of the class of 1917 at Jefferson Medical College, Dr. Bockus was recognized by his classmates, even at that early stage in his career, as "sure to attain the highest success in his profession." Certainly, his photograph in the Jefferson 1917 Year Book shows someone who looked to the future with strength, determination, and great confidence. A two-year tour of duty as a lieutenant in the Medical Corps of the United States Marines followed medical school graduation. A portion of this time was spent at the American naval base at Guantánamo, Cuba, and it is probable that Dr. Bockus' lasting interest in Latin America and in its people began there. On return to civilian life Dr. Bockus served as an intern at St. Luke's Hospital in Bethlehem, Pennsylvania, and then entered a residency in medicine at the Lenox Hill Hospital in New York. This proved a most important step because it was there that Dr. Max Einhorn was taking some of the first steps that would establish gastroenterology as a clearly identified division of internal medicine. Dr. Einhorn was German-born and German-trained. He was a forceful teacher with a strong sense of discipline; in Dr. Bockus he found an apt pupil, who rapidly acquired habits of close attention to detail, accuracy of observa-

tion and recording, impatience with inaccuracy, and skill in assembling the evidence needed to resolve difficult clinical problems. Under this tutelage Dr. Bockus became a perceptive, thoughtful, and critical physician.

In 1921 Dr. Bockus returned to Philadelphia to enter practice. The Graduate School of Medicine of the University of Pennsylvania was in the early stages of its development as a teaching center to which practicing physicians could return for educational programs that would help them undertake the transition from general practice to a specialty. A broad program organized by Dean George Meeker sought to integrate into clinical application the great advances then being achieved in the basic medical sciences. The time was propitious for this development of graduate medical education. Many physicians were returning to civilian life after their military service during World War I. They were eager to gain the knowledge and skills that would help them enter new and different medical fields. Many were given assistance for this by educational grants under the G.I. Bill of Rights. Further, many foreign physicians and medical students were seeking broader education and training in this country and were supported in their purpose by their own governments and by various forms of United States aid. The Graduate School of Medicine and its Graduate Hospital soon gained national and international recognition of the programs it offered, and for its outstanding faculty of physician-teachers, the skillful integration of basic sciences and clinical skills, and its progressive teaching methods. The stimulating atmosphere was certainly one to attract a competent and ambitious young physician, one who already had a well defined interest in a specific medical area. At the invitation of Dr. George Morris Piersol, then Professor of Medicine, Dr. Bockus joined the faculty of the Graduate School of Medicine and the staff of the Graduate Hospital. At first this was for the purpose of establishing a "Gastric Clinic." In a short time, however, a ward service in gastroenterology was established and lectures, conferences, and increasing numbers of technical procedures were added gradually until a fully developed program in gastroenterology had been created. As Dr. Bockus' teaching and hospital responsibilities increased, he advanced in faculty rank. In 1931 he became Professor of Gastroenterology and in 1949 he also became Professor of Medicine and Chairman of the Departments of Gastroenterology and Medicine in both the Graduate School of Medicine and at the Graduate Hospital. He retained these positions until he became Emeritus in 1960.

Dr. Bockus' conferences in gastroenterology at Graduate Hospital soon became known to large numbers of physicians. Attendance at

these conferences soon increased far beyond the students normally enrolled in the University's Graduate School of Medicine. The controversial problems discussed in depth by clinicians, surgeons, radiologists, and pathologists always aroused stimulating give-and-take discussions, with references to recent literature, reviews of technical procedures, and expressions of opinions based on extensive group experience. Dr. Bockus always maintained full control of the flow of discussion. His ability to summarize succinctly, to bring back to the center of attention the basic problem to be reviewed, to reach the right conclusion at the right time, and his skill in spotting errors, all served to bring out the essential points and to lead the participants and the audience to the proper conclusions. Everyone present learned how to prepare and to present data clearly and logically. Faculty and students in attendance learned the need for clear thinking and learned how the skillful physician seeks the essential facts in a mass of detail. The style of teaching can be described as the Bockus version of the Socratic Method — a question expressed with just enough wit and a slight touch of sarcasm to make the question penetrate and inspire a thoughtful and not a hasty answer. In establishing this pattern of conference teaching at Graduate Hospital, Dr. Bockus left the Hospital a great heritage, one that has served over the years to maintain Graduate Hospital as an institution in which teaching and a strong educational effort are recognized as a major function and a major responsibility of the hospital. To all of his staff and to all of his students Dr. Bockus became a role model. All benefited by their efforts to emulate him as a teacher and as a physician. Many went on to develop their own departments of gastroenterology and many became leaders in this specialty throughout the United States and in many countries around the world. In later years, a large number of his former students and trainees joined to form the Bockus Society, a group dedicated to the advancement of the teaching and practice of gastroenterology. This Society will certainly maintain the traditions of scholarly excellence instilled by Dr. Bockus.

During these years of teaching and clinical activity, Dr. Bockus and his associates contributed almost two hundred articles to the literature of gastroenterology. These covered a wide range of topics — peptic ulcer disease, functional gastrointestinal disorders, inflammatory bowel diseases, and many other disorders. In due course, Dr. Bockus recognized that it was best to center his efforts in the production of a single text. The first edition of his *Gastroenterology*, written with the assistance of his colleagues in the Graduate School of Medicine, was published in three volumes between 1943 and 1946. "Bockus" soon became the "Bible" of gastroenterology. Widely used and widely quoted, it was the

first of the modern texts in its field. The second edition appeared in 1963 and 1965, and the third edition of four volumes was published in 1974 to 1976, with the help of former students whom Dr. Bockus selected to act as associate editors. This outstanding text has become a reference work used by gastroenterologists throughout the world. It has already been translated into Spanish, Portuguese, and Italian. At the time of his death Dr. Bockus was planning a fourth edition. One hopes that the writing and publication of this great work will go forward under the guidance of the co-editors with whom he had been working.

Dr. Bockus' major contribution to the growth and widening recognition of the importance of his speciality was recognized by all gastroenterologists. He served, in 1948, as President of the American Gastroenterological Association, and in 1962 he was honored by that Association by being awarded its Julius Friedenwald Medal. He was a founding member of the Subspecialty Board of Gastroenterology of the American Board of Internal Medicine and was an early Chairman. He was also Chairman, in 1958, of the first World Congress of Gastroenterology and President of the Organization Mondiale de Gastroenterologie from 1958 to 1962. He served on the editorial board of *Gastroenterology* and of the *American Journal of Diseases of the Colon and Rectum.*

Through the years Dr. Bockus received many other honors. These included honorary degrees from Dickinson College, Thomas Jefferson University and the University of Pennsylvania, the 1970 American Medical Association Distinguished Service Award, and the Strittmatter Award of the Philadelphia County Medical Society. He also received the Caldwell Medal of the American Roentgen Ray Society. He was also an Honorary Fellow of the Royal Society of Medicine of London. In addition Dr. Bockus was an honorary member of the gastroenterological associations of Columbia, Cuba, Chile, Brazil, Peru, the Dominican Republic, Uruguay, Venezuela, Belgium, Germany, and India; he received medals of honor from the governments of Peru, Chile, and the Dominican Republic. The Graduate Hospital has indicated its great debt to Dr. Bockus by founding in his honor The Bockus Research Institute, which has been the nucleus of the growing research activities of that hospital.

Dr. Bockus was a vital and lively person. His vibrant style of speaking, his incisive use of words and sense of timing, his complete knowledge of his subject all combined to create the great teacher whom all of us admired. Of equal importance were his sense of humor, his broad intellectual interests and, above all, his feeling of human obligation to others. This led him to participate intensively in the efforts of Dr. Tom Dooley in establishing and working for MEDICO in the developing

areas of the world and helping the victims of famine and war. Dr. Bockus served as a member of the board and as vice-president of MEDICO and Care from 1962 to 1981.

In all of his medical and community activities, as well as in his many humanitarian efforts, Dr. Bockus was ably assisted by his wife Rosalynd and his daughter Barbara, who joined in his varied interests, made his friends their friends, and gave him the environment of love, sharing, and participation so necessary for ease of mind, so necessary as the soil in which great thoughts can grow. These two, his immediate family, will feel most the void created by Dr. Bockus' death, but Dr. Bockus had, in reality, a much bigger family — a tremendous family. There is a picture taken at one of the meetings of the Bockus Society of Dr. and Mrs. Bockus standing completely surrounded by just a portion — perhaps one hundred and fifty — of his former students. Everyone in the picture is smiling, all lighted up by the strength, and the feeling of unity and purpose, that emanated from the person whose guidance had brought them together. These students are Dr. Bockus' family too, and they will carry on the great traditions of medicine that he has handed down to them.

Errata

Dr. Leonard Jan Bruce-Chwatt has advised *Transactions & Studies* that there are two printing errors in his article, "Oliver Cromwell's Medical History" (Series V, Volume IV, No. 2, June 1982). Page 103, third line from the top of the page, should read: "straight canal twenty miles long was cut through the lowland, to *lower* [not *cover*] the water-table . . ." On page 120, fourth paragraph, line 3, the apothecary who treated Charles II was Robert *Talbor*, not *Taylor*.

Clinical Cytopathology for Pathologists — Postgraduate Course

The Twenty-fourth Postgraduate Institute for Pathologists in Clinical Cytopathology is to be given at The Johns Hopkins University School of Medicine and The Johns Hopkins Hospital, Baltimore, Maryland, April 18-29, 1983. The full two week program is designed for pathologists who are Certified (or qualified) by the American Board of Pathologists (PA), or their international equivalents.

It will provide an intensive refresher in all aspects of the field of Clinical Cytopathology, with time devoted to newer techniques, special problems, and recent applications. Topics will be covered in lectures, explored in small informal conferences, and discussed over a microscope with the Faculty. Self-instructional material will be available to augment study at individual pace. A loan set of slides with texts will be sent to each participant for home-study during March and April before the Institute. Credit hours 125 in AMA Catagory 1.

Application is to be made before February 2, 1983. For details, write: John K. Frost, M.D., 610 Pathology Building, The Johns Hopkins Hospital, Baltimore, Maryland, 21205, U.S.A.

The entire course is given in English.

Transplantation of the Heart: Medical, Human, Scientific, and Economic Aspects

MICHAEL C. PETCH

THE first transplantation of the human heart took place in 1967.[1] It was followed by a wave of misplaced enthusiasm and a spate of operations with, mostly, disastrous results. Despite this setback a few centers carried on a program of cardiac transplantation and, during the last decade, the results improved so that in 1978 Shumway and his colleagues at Stanford were able to publish survival rates of 66% at one year and 58% at three years.[2] This work led to a resurgence of interest in the United Kingdom, and in 1978 the Department of Health acknowledged the need to reassess the place of this form of treatment. This change in attitude was supported by three arguments: first, the concept of brain death had received official definition[3] and this allowed the removal of the beating heart; second, techniques of myocardial preservation had improved so that hearts could be stored and transported, if necessary, over long distances; third, the development of safe percutaneous myocardial biopsy permitted more accurate diagnosis of rejection episodes.

A program of human heart transplantation was started at Papworth Hospital in 1979 using protocols identical to those employed at Stanford.[4] The author was initially associated with this program but after the experience of assessing 54 potential recipients, 12 of whom received transplants, he withdrew from the program for reasons which form the basis of this paper. The reasons may be classified under four headings — medical, human, scientific, and economic.

Medical

Every experienced physician has had the misfortune to watch a young person die from intractable heart failure. Severe heart failure, commonly due to congestive cardiomyopathy or ischemic heart disease, is the prime indication for cardiac transplantation. The other criteria are now well defined and include age under 50 (sometimes 55) years, low pulmonary vascular resistance, a stable personality, freedom from other diseases, such as diabetes mellitus, and recent pulmonary infarction. In some patients progressive

deterioration resulting in cardiac cachexia leaves no doubt that death is inevitable. The decision to offer a heart transplant in these circumstances is not difficult. However, in the majority of patients with severe heart failure the deterioration is less easy to gauge and remission may occur. Often these patients are men in their 30s and 40s with ischemic heart disease. Usually they will have been investigated by cardiac catheterization with a view to surgical treatment, e.g. left ventricular aneurysmectomy. But aneurysm may be absent and thus conventional surgery has little to offer. The team which undertakes the investigation is naturally reluctant to disappoint the patient and starts to consider other forms of treatment, i.e. cardiac transplantation. It is important to note the subtle change that comes about once surgical treatment is envisaged. The question is no longer what is best for this patient, but rather what operation can help this patient? The emphasis has shifted from the human and medical problem to a surgical and technical one. The decision will be influenced inevitably by the transplant surgeon's enthusiasm for his operation and by the hopes of the patient and his family, who are often aware of the dramatic improvement that surgery can sometimes offer. A chain of events has been set in motion which the physician is powerless to stop. Any physician associated with a program of cardiac transplantation will appear churlish in refusing such a patient a chance of improvement. Yet he, like any other experienced physician, knows that some of these men will continue to live a reasonable albeit sedentary life for months or even years before suddenly succumbing to ventricular fibrillation. The natural history of end-stage cardiac disease is not fully appreciated by cardiac surgeons because, until the advent of cardiac transplantation, such patients were not referred to them. They cannot be expected to appreciate the spontaneous fluctuation in symptoms or the improvement that can be brought about by simple medical measures such as bed rest.

The unpredictable progression of both ischemic heart disease and congestive cardiomyopathy means that only the patient's personal physician can reasonably decide about the appropriateness of cardiac transplantation. But he will not be aware of the complications of heart transplantation and, moreover, his own motives for referring the patient merit careful scrutiny. A common reaction to the program at Papworth has been a sense of relief amongst other cardiac physicians, a feeling which has been expressed in the words, "Thank goodness someone else is doing it." This feeling may be due

to the desire for a quiet life but it may also be due to the physician's reluctance to face up to the death of his patient. By referring the patient for heart transplantation is the physician evading his responsibility? Usually this is not the case. The patient and his relatives are reassured to know that cardiac transplantation has been considered and that every avenue has been explored. However, there are occasions when a program of heart transplantation allows the referring physician to shirk his responsibility for managing his patient's death, an experience which all physicians would like to avoid but one which is, nevertheless, a privilege of the profession.

Thus far we can accept that there are a few young patients dying from heart failure, but their selection poses problems. The selectors are also exposed to other subtle pressures. One of the criteria laid down by the Department of Health in the United Kingdom in 1979 was that any new series of heart transplants should be a part of a planned program. Unfortunately the Department went further and recommended that a transplant center should undertake a minimum of 8 to 10 cases per annum. Suppose eight suitable cases were not forthcoming? Would official approval be withdrawn? The insidious pressure to accept patients is evident and is enhanced by the surgeons's wish to build up a waiting list of potential recipients to facilitate the administration of the program — for example, a variety of patients with differing blood groups would allow better matching of the donor heart with the recipient. If unsuitable patients — that is, patients with a relatively good prognosis — were to be given transplants, they would be expected to do well following their operation. It should be possible to detect this phenomenon by comparing the survival of those who received transplants with the survival of those who were accepted for transplantation but who were unfortunate (!) in that a donor heart was not forthcoming in time. Little attention is usually paid to this comparison. The survival of patients accepted for transplantation but not given transplants should form a part of any publication on this subject, especially since there is some evidence that improved quality and duration of life in patients with end-stage heart failure may be expected with modern therapy, including the use of vasodilators.[5]

The fate of some of the unsuccessful candidates for cardiac transplantation must also be considered. Some patients referred to Stanford for transplantation do not receive new hearts because they are too sick. Their chances of survival are so poor that the effort is not worthwhile; even if the operation succeeds, the early postopera-

tive complications will prove fatal. These patients, and those who are accepted but are not given transplants, have faced death and have seen a chance of survival, only to find that chance denied them. Some do not have the psychological strength to withstand this experience and die in misery, clutching at straws.

On balance then, there are a few, and they are probably very few, memorable patients who have no chance except that offered by a heart transplant, but for a number of understandable reasons there are considerable pressures on any transplanting team to accept patients whose prognosis may be quite good. In making a decision, the quality of life following cardiac transplantation is obviously most important.

On waking after the operation patients feel wonderful. The debilitating effect of a prolonged low cardiac output on both the physique and the psyche can be reversed overnight. The return of a vigorous intellect may be illustrated in many ways, but for one obstetrician who received a transplant at Papworth Hospital it took the form of not only asking for *The Times* but also of reading it from cover to cover and then solving the crossword puzzle for the first time in many months. Function is restored to organs other than the brain; a diuresis ensues and it is of interest that despite this the serum creatinine level may rise as masses of decaying skeletal muscle receive a proper blood supply again.

This honeymoon period lasts a short while until the rigors of the early postoperative regime are established. Isolation, careful monitoring, investigation, and early treatment of suspicious lesions are essential in order to steer a course between the hazards of rejection and infection. Underlying the management of the transplant recipient is the disturbing question, Does this development mark the beginning of a fatal illness? Thus it is unlike ordinary medicine, where continued observation may lead to diagnosis and often to a solution of the problem without any active intervention. In the transplant patient, for example, a lung shadow must be fully investigated on suspicion with tomography, needle biopsy, and so forth, in order to prove or disprove the possibility of a potentially fatal infection. Not all the investigations are unpleasant; daily chest radiographs, electrocardiograms, and venesections hardly matter, but cardiac biopsies are more bothersome and a few patients come to hate the needle. The treatment directed against rejection is more unpleasant and most patients have adverse reactions. Most patients also become Cushingoid in time and are at risk from the complica-

tions of long-term steroid therapy. Whilst it may be true that the technique of cardiac biopsy permits a more accurate diagnosis of rejection episodes, the treatment of cardiac rejection has changed little. Virtually all patients suffer at least one rejection episode and at least one infection ranging from minor herpes zoster to major herpes encephalitis or fungal pneumonia. Even a minor complication may prove an intractable misery undermining the patient's quality of life. How many of us enjoy life when afflicted by the trivial discomfort of the common cold?

A troublesome aspect of the complications of cardiac transplantation is the fact that they are iatrogenic. They are a direct result of the treatment that the physician has recommended. It is one thing to watch a patient dying from cardiac failure; it is quite another matter to watch a patient dying from generalized herpes which he has acquired as a result of immunosuppressive therapy following cardiac transplantation. Surgeons accept this hazard more readily than physicians. They know when they set out to perform an operation that there is a morbidity and mortality associated with the operation, and they accept this. Cardiac surgeons have learned to live with the fact that a policy of elective closure of asymptomatic atrial or ventricular septal defects will mean that on rare occasions a previously fit person may die accidentally or may suffer a stroke in order that the vast majority of other such patients should benefit. However, the complications of these other forms of cardiac surgery are usually immediate or occur within a few days of operation. Even in the early days of cardiac surgery the outcome was determined to a large extent by what happened in the operating theater. This does not apply to cardiac transplantation, where there is a continuing risk, due primarily to the risk of infection and rejection, but also to accelerated atherosclerosis in the arteries of the transplanted heart and to tumors, especially lymphoma. This risk far exceeds the generally acceptable risks that follow conventional surgery, e.g. long-term anticoagulation following prosthetic valve replacement.

Treatment of cardiac rejection has to be vigorous. Unlike renal transplantation, where the patient can go back on dialysis, cardiac rejection ultimately means death. The treatment of rejection episodes may be improving and the complications described result from the use of steroids, antithymocyte globulin, and azathioprine. The advent of cyclosporin A is exciting and may improve the treatment of cardiac rejection; this advance may in turn enhance the quality of life following cardiac transplantation. However, few new drugs fulfil

their early expectation and the side effects of treatment with cyclosporin A are not yet fully appreciated; it seems possible that there is an increased incidence of lymphoma.[6] It is, therefore, too early to say whether the use of this new immunosuppressive agent will alter the indications for cardiac transplantation; if the drug fulfils its early promise, some relaxation of the present strict selection criteria may become possible.

On medical grounds cardiac transplantation may improve the quality and length of life of some young people who would otherwise die from cardiac failure. Great care must be exercised in the choice of recipients and it is important not to underestimate the rigors of the postoperative management. The mortality statistics conceal a distressing morbidity both in those who subsequently die and in those who subsequently survive with near normal health. Physicians should be aware that the treatment may not be sufficiently better than the disease.

Human

In most instances organ transplantation is made possible by the death of another person, someone who was healthy until his demise. Any form of treatment that starts from this point is never going to be an unqualified success. There will always be sadness and regret over the donor's often accidental, and always tragic, death. The notion that the victim's brain may "die" before other organs such as the heart and kidneys has received official approval in the United Kingdom. The statement by the medical Royal Colleges and their faculties[3] has provoked controversy, but on purely medical grounds there can be little doubt that the identification of brain death means that there can be no hope of independent survival. Regrettably there has been no attempt to determine which hospitals in the United Kingdom are competent to make the diagnosis of brain death. Diagnostic aids, such as the electroencephalogram, are rarely used; perhaps the real reason for this is not that the clinical diagnosis is inadequate but rather that most hospitals do not possess an electroencephalograph. Even if they did, few doctors are capable of interpreting the trace. If transplantation is to continue, the Department of Health has an obligation to inspect all hospitals offering organs from brain-dead patients. This would prove helpful and reassuring to both the public and the medical profession. A number

of transplant surgeons will admit privately that they have been called to see potential donors who did not fulfil the criteria for brain death; one surgeon has even admitted this in public. Whilst no one seriously questions the integrity of the transplant surgeon, his enthusiasm and his wish to do his best for his patient is not in the interest of the potential donor, who must be protected not just by criteria but by being in the hands of capable identifiable doctors.

Although the concept of brain death is recognized, doctors are still reluctant to ask relatives of potential donors for permission to remove organs for transplantation. Why? Idleness or lack of charity[7] are unlikely explanations. Could it be simply that people find the removal of a beating heart distasteful? The moment of death is indefinable but custom has equated it with cessation of the heartbeat; although this may be illogical, traditions die hard. Do some relatives wish to be left in peace with the brain-dead subject until his heart stops? Is the specter of the transplant surgeon impatiently waiting compatible with the peaceful and dignified demise that most of us hope for? Pappworth has put it more bluntly: "You do not bury a man with his heart still beating."[8]

This is not a point of view that can be modified by debate. It is similar to an appreciation of art or music; some pieces appeal to us and some do not. Some are "right" and some are ugly. In medicine some techniques have an immediate aesthetic appeal and an obvious future; cardiac pacing, for example, is a simple and very satisfactory form of treatment. Other procedures are frankly unpleasant and of doubtful propriety; for example, therapeutic abortion. But they are accepted by society because, on balance, they diminish the sum of human suffering. In the case of cardiac transplantation the balance is against it.

This does not mean that renal transplantation is unacceptable. The kidneys should be removed after the heart has stopped. This will prolong the ischemic time and may reduce slightly the chances of subsequent normal renal function but, if the general public were confident that the kidneys were being taken only after the donor's heart had stopped, the number of donor kidneys might well increase, reversing the fall that occurred in 1980 after a BBC television program had severely criticized the concept of brain death. It may seem unfair to blame heart transplants for the shortage of renal donors but the relationship is indisputable.

Publicity seems to be an inevitable accompaniment of heart

transplantation. The donor, the recipient, the surgeon, and the hospital are all subjects of legitimate public interest as television programs and newspaper reports continue to testify. No doubt this is due to the unique place that the heart has in man's imagination. Perhaps people also experience a curious *frisson* when they see a man with another's heart beating inside him. But whatever the reason, the publicity and its consequences cannot be ignored. Papworth Hospital has achieved notoriety, which is distressing to those members of its staff who prefer not to be associated with heart transplantation. Physicians especially would rather tread silently along the "cool sequestered vale of life" and shun publicity. Others feel uneasy and the even tenor of hospital life has become distorted to the detriment of good working relationships.

Some of the recipients are only too well aware of the public spotlight and seem to thrive on it. Patients with terminal heart failure who accept the offer of a new heart are, of course, a highly select population and their decision may have been influenced by the knowledge that they would excite public interest. The publicity is just one possible explanation for the unusual behavior that some of these men exhibit following transplantation. Some change in personality might be expected following a terminal illness, major surgery, isolation from family and friends, steroid therapy, and dependence upon medical and nursing staff. However, more than one wife has commented that the man who went into hospital was not the man who came out.

Quite apart from any publicity, the attitude of the potential recipient is a curious one. He actually hopes for the death of another person. This places him at odds with society, and conversation on some subjects such as the death penalty or the compulsory wearing of seatbelts in motorcars is awkward to say the least. One potential recipient actually looked forward to icy roads at the weekends. This macabre aspect of organ transplantation is another disquieting phenomenon which people prefer not to discuss.

Thus heart transplantation has its disturbing aspects, and whatever the merits and demerits of the concept of brain death it seems highly likely that most of the profession and the public would rather let the heart stop beating before pronouncing the patient dead. This must always be a major drawback to any program of cardiac transplantation.

Scientific

Science advances because scientists propose hypotheses and then set up experiments to refute them.[9] Medical science is no exception. Some of the hypotheses and experiments are mundane, e.g. does Treatment A work better than Treatment B? But always the hypothesis should be new. The program of cardiac transplantation at Papworth Hospital is not breaking new ground; it is merely the application to British patients of techniques developed at Stanford. Thus its scientific role is to corroborate the results of others. This should not necessarily be decried, although it has limited value.

Is there a scientific "spin-off?" Does the existence of the program allow us to learn something about the heart or about organ transplantation which is of potential benefit? The "something is bound to turn up" approach is often used to support weak research programs and occasionally bears fruit. But what might turn up? The removal of the recipient's heart provides a unique opportunity of studying the biochemistry of diseased myocardium, including the metabolic pathways within the cell, the various functions associated with cell membranes such as the adrenoceptor, and the coronary arteries with their pathology. By biochemical standards the quantities of tissue are enormous and the fact that they tend to become available in the middle of the night should not deter the true research worker. So the availability of fresh human hearts might teach us something; but the lesson may well be that human hearts differ little from other mammalian hearts, any differences being quantitative not qualitative.

The function of the transplanted heart is another area of interest but the physiological behavior has been well studied in animals and these results have been confirmed at Stanford[10] There may be metabolic differences[11] but, again, the confirmation of results already obtained in animals does not seem a very profitable line of research unless it has therapeutic applications. One property of the transplanted heart that is of more interest is its liability to accelerated coronary atheroma. Investigation of this model of such a widespread pathological process could improve our understanding of the early events in the development of atheroma and might indicate that atheroma is a nonspecific response to endothelial injury. Certainly the model has been used to demonstrate the beneficial effects of lipid-lowering regimes in improving survival.[12] The electrophysiological behavior of the transplanted heart also

differs from that of the normally innervated heart. This has some inherent interest and may be useful in separating the direct and indirect cardiac effects of drugs such as disopyramide.[13] But do these sidelines justify the initial operation? Or are the patients being used as guinea pigs?

The fundamental scientific problem in organ transplantation is an immunological one. It should be possible to recognize the moment when the body begins to reject the donated organ. Before rejection occurs, the antigen has to be detected by the host, antibodies have to be generated, released into the circulation, and then bound to the antigen. There are several points in this sequence which could be identified by serological or radionuclide techniques and which might then be interrupted by an appropriate antibody. However, these methods are not yet available; at present the diagnosis of cardiac rejection has to rely upon functional and pathological changes which must be late events. Is there anything that we might learn from studying human heart rejection that we could not learn from animal experiments or even, as Leaf has pointed out,[14] from renal transplantation in man? Surely this is not the case.

Why is organ transplantation a major interest amongst academic surgeons? The surgical procedures are now well established and, as we have seen, the research endeavor is primarily immunological, not surgical. New surgical techniques are unlikely to offer much advantage. Further improvement might be expected in the field of organ preservation, graft-recipient matching, and possibly, immunological pretreatment of the donor heart. But these are hardly the surgeon's province. His biggest challenge must be the development of an artificial heart. Here the chief difficulties seem to be the power source and the anastomosis between the prosthesis and the patient. These might prove insuperable but in so far as one can look to the future this avenue must have greater potential. Perhaps a comparison might be drawn with cardiac pacemakers. Both present mainly technical problems but the modern generation of pacemakers and electrodes would have been difficult to imagine two decades ago. It has to be conceded that artificial hearts are some years away, and research-minded surgeons are more likely to get results by transplanting organs. There can be no objection to animal experiments in this field; indeed, they should be encouraged in the hope that one day it will become possible to use animal hearts in man. But again we

return to the question, Why are academic surgeons becoming part-time immunologists?

To some extent all contemporary medical research is dependent on advances in other disciplines. The diseases of man and their clinical features have been well described. So research in cardiology, for example, is now determined by developments in physics which allow us to obtain high-quality images of the heart, materials which permit coronary angioplasty or right-heart catheterization at the bedside, microprocessors which detect and analyze arrhythmias, and by pharmacological research which continues to discover new classes of drugs. These and other advances have been applied by physicians to their patients, thereby forming the basis of much useful clinical research. The surgeons have not been so fortunate. The last major advance in cardiac surgery was Favoloro's invention of coronary bypass grafting.[15] This was the climax of a remarkable phase of development which ushered in the modern era of safe open-heart surgery. Apart from pediatric cardiac surgery only transplantation is exciting the cardiac surgeon's interest and so he has to take up immunology. Perhaps we should alter our concept of surgery and regard it as a craft, not an academic subject. Moreover it is a craft which may have reached its zenith. Thus academic surgeons should be turning their attention not only to immunology but to other subjects which may be relevant to their craft, such as endoscopy, interventional radiology, and cardiac pacing.

Leaf's conclusion that the scientific arguments are not sufficiently strong to support a program of cardiac transplantation are as valid now as they were when he wrote in 1980. Transplantation of the human heart may well be a scientific cul-de-sac.

Economic

Medical care in the United Kingdom is provided by the National Health Service, which is funded directly from the national income. Private health insurance schemes do exist but their budget is a very small percentage of the total and they are mainly concerned with elective procedures such as operations for varicose veins and the like. Today 5.2 percent of the national income is spent on the Health Service and this compares unfavorably with the condition in all other developed countries. Whilst some constraints on expenditure are necessary, the chronic under-funding of the Health Service in Britain is a scandal which has been concealed by successive

governments. Over the past two decades the Service has been trimmed, so that nowadays hospitals are often able to handle emergencies only. Routine out-patient appointments may have to wait many months. In parts of the country the waiting lists for some elective surgical procedures, such as hip replacement, may be a year or more in length. This situation is likely to deteriorate because the government is pledged to improve the geriatric and psychiatric services. These services are mainly concerned with the long-term care of people who are unable to look after themselves, an increasing problem in the ageing population. Compared with the acute medical specialities, geriatrics (gerontology) and psychiatry have been relatively unattractive to doctors and nurses and have been short of staff and facilities. But any increase in their budget without an increase in the total budget must be at the expense of another part of the Health Service. The more costly aspects of medicine, such as cardiac surgery, seem likely to suffer most. This will occur not by any clear decision but by a failure to respond to the increasing demand for cardiac surgery, especially coronary artery bypass grafting. Many doctors in the United Kingdom have been slow to appreciate the usefulness of this operation and its ability to relieve angina. Thus the demand here has lagged behind that in the United States and, whilst there has been an increase in the number of operations performed, the supply still fails to satisfy the need. Waiting lists for elective cardiac surgery exceed one year in parts of the United Kingdom with the result that the wage earner of the family loses his job and often fails to return to work despite subsequent successful surgery. Quite apart from the morbidity and mortality of the waiting time, this is not economic good-sense.

In 1979 the cost of a heart transplant operation at Papworth Hospital was estimated to be £17,000 ($30,000), i.e. five or six times the cost of a conventional heart operation. In the light of the foregoing account this cannot be justified. However, there are two mitigating factors. The first is that the program at Papworth has been supported by charitable donations and not by the Health Service. One businessman has paid for the first two years of the clinical program, the British Heart Foundation has given a substantial grant to support research, and the public continues to raise money. This state of affairs may well continue because heart transplantation has excited the public's imagination. Thus it cannot be said that the program is deflecting funds from other parts of the Health Service.

Second, it can be argued that some official expenditure on new techniques is essential, otherwise medicine would not progress. This argument is a matter of balancing the potential of a new technique against the cost. At the moment the medical, human, and scientific aspects must weigh heavily against official funding of heart transplantation. Similar discussions are taking place in other areas of medicine. For example, it is now possible to fertilize human ova in vitro and there is a limited demand for this new procedure. Here the British government has also let market forces operate, and a private clinic has opened in the United Kingdom (just a few miles from Papworth!); this will allow some assessment of the procedure and its future role. Why not allow the enthusiasm and fund-raising activities of the protagonists of a medical development determine its future? An official decision to fund a new procedure can thus be deferred. Such a laissez-faire policy may be a reasonable way of proceeding, because at any point in medical history it is very difficult to determine what is medical progress and what is a cul-de-sac. By all means let people spend their money on heart transplants if that is what they want to do. Medical research organizations can make up their own minds. The government can await events and meanwhile spend its money on other surgical procedures, e.g. coronary artery bypass grafting, thus avoiding controversy.

We tend to remember the controversies surrounding the early days of those procedures that did become accepted, such as operating on the heart. We forget those that did not: who now remembers the controversy over focal sepsis? At present coronary angioplasty is controversial. It is undoubtedly a medical advance, but will it be with us ten years hence? Only an unwise man would commit himself or indeed attempt to stop any of these new techniques. We would do well to reserve judgement on which innovations represent progress.

Reserving judgement is more or less impossible when a controversial subject such as cardiac transplantation is introduced into a small hospital like Papworth. At the outset opinion within the hospital was sharply divided and the division has become accentuated with the passage of time. All hospital doctors will be familiar with the emotions aroused by this sort of controversy. Similar differences of opinion have caused clinical colleagues to avoid each other for years, to the detriment of their service. The program of cardiac transplantation at Papworth with the subsequent changes in surgical staffing

has been no exception. For example, one cardiologist now feels unable to refer his patients to those cardiac surgeons who are prepared to remove the beating heart, with the result that some of his patients have to be sent elsewhere. His unusual but sincere point of view has been ignored. The details of such hospital controversies are usually tedious to the outsider but the principles are important. Hospital doctors have to work together and if one group gets carried away by a sense of its own importance — a not uncommon problem in some surgical departments — the balance of power within the hospital is disturbed. In extreme circumstances the surgical megalomania destroys the work of the hospital. But how to prevent it? Only by compromise on both sides.

It is true that heart transplantation has attracted extra staff to Papworth Hospital. They have been attracted by the notoriety and have their salaries paid by transplant funds yet do some Health Service work. On the other hand a heart transplant operation can and does interfere with the ordinary clinical service by causing routine operations to be delayed. Such patients are often too polite to express their disappointment.

These economic and administrative considerations are of less general interest but let no one underestimate the profound effect that heart transplantation can have on the running of a hospital. For an individual to steer a steady course through the emotional minefield can be very difficult indeed. He should not interfere with the clinical judgement of his colleagues but he should make his views known both to his colleagues and to other doctors, so that they may profit by the experience.

Conclusion

For medical, human, scientific, and economic reasons a program of cardiac transplantation is not at present justified in the United Kingdom. Animal experiments should continue in the hope that animal hearts can be implanted into the few individuals who have demonstrable, progressive, and severe heart failure. In the longer term an artificial heart might be the best form of treatment.

Regional Cardiac Unit
Papworth Hospital
Papworth Everard
Cambridge CB3 8RE
England

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The Driftwood Case: Pioneering Antipollution in Pennsylvania*

KATHARINE R. BOUCOT STURGIS

ON Good Friday, 1962, Doctor Jan Lieben, Director of the Pennsylvania State Department of Industrial Medicine, and several members of his staff called on me in the Department of Preventive Medicine at Woman's Medical College of Pennsylvania. They discussed a situation in Driftwood, Pennsylvania where they had been trying unsuccessfully to stop the open burning of rejected telephone cable by an entrepreneur who had no regard for the health of the small rural community. My report on the health of the residents of Driftwood, made with Doctor Doris Freudenberg, then Lois Maddox Miller Fellow in Preventive Medicine, pretty well describes the situation.[1]

We had arranged through Doctor Lieben to visit Driftwood on Monday and Tuesday, May 28th and 29th. Sixty-two residents of Driftwood were interviewed about their health and that of their families. Data were collected on 136 persons. We took a house-to-house sampling of homes along the T-shaped valley in which the town lies. We travelled along River Road, a small area of Castle Gardens, Route 555 as it ascended from the river, Second and Third Streets, and carried out interviews at the hotdog stand and the Texaco station. We spoke with men working on the road and at the Pennsylvania Railroad watchtower.

We arrived at Driftwood on Monday at about 1:30 p.m. As we approached the town there was a small fire burning in the field adjacent to the Metal Wire Recovery Corporation. This type of burning was carried out at all times during the day, but there were no larger burnings. There was a light drizzle during most of the afternoon.

All but seven of the 136 persons on whom the epidemiologic study was based had complaints. Of the seven who had no complaints, one was employed at the plant, two had close relatives employed at the plant, and one was a member of the Borough Council. The

1. Katharine R. Boucot [Sturgis] and Doris Freudenberg, *The Health Status of Residents of Driftwood, Pennsylvania* (1962).

*Prepared from Oral History Program tape recorded May 14, 1980.

pattern of mild to severe mucosal irritation with actual nosebleeds and bloodstreaking of sputum was widespread. Cough and headache were the most frequent complaints, having been reported in 48 instances. Gastrointestinal complaints were the next most frequent, ranging from anorexia through nausea to frank vomiting in 15 instances. I talked with the teachers at the local school. They told me that when open burning was carried out and the school was downwind from the site of the fire, the children's complaints increased, and they had nosebleeds, nausea, and vomiting. The majority of the citizens of Driftwood seemed to suffer from one or more adverse effects due to the burning. Two households had caulked some or all of their windows to keep out the noxious fumes. Mrs. Kennedy had caulked her bedroom windows, Mrs. Hugar all her downstairs windows. The results of the examinations are summarized on pages 31–33 of our report.[2]

The acid nature of the material which spread over the town is attested by the etching of aluminum window frames and furniture which I observed at the homes of Mister Sweet and Mrs. Kennedy. The fact that the fumes were, at least at times, extremely irritating is attested by the report of Mister Hugar, a high school teacher in Emporium. As soon as he drove over the hill from Emporium on his way home from the school, he knew at once if the site were burning because he would suffer severe chest pain.

Several residents supplied the Health Department with photographs of decreased visibility associated with the burning. I observed a metal sign posted near the railroad advising trains to slow down because of poor visibility. I went along the railroad to the watchtower and, my coming not having been announced, was greeted with amazement by the railroad employee. I observed that he had a mask next to the chair in which he sat. When I inquired as to why the mask was there, he said it was to protect him from the open burning operation when the wind was blowing. The name of the railroad employee who was in the watchtower at the time of my visit was Thomas H. Bloom. Later he wrote me a note giving me the address of a man we had discussed. The note does not indicate what we discussed about the man, but Mister Bloom promised, "If I can be of any further help please feel free to call on me. I thank you." which

2. *Ibid.*

intimated that he was very disturbed by the situation.[3]

We designed a questionnaire—the so-called Alabama Survey Questionnaire—which we used in compiling our data. Each interviewed resident signed a form supplied by my lawyer to release me from any legal responsibility. After concluding my study, I made the following recommendations:

1. Open burning should be banned totally and finally.
2. The plant should be surveyed by an industrial hygienist to determine the effects of "cooking" of polyvinyl chloride materials which cover the telephone cables.

Reports continued to emanate from Driftwood. Miss Daisy Smith taught the three lower grades in the Driftwood School. She volunteered to me that she herself had developed a sore throat and cough. She confirmed that an acute episode had taken place on October 12th, 1960, in which the children had been vomiting; this had first been reported by Harry House. Another schoolteacher, Mister Kuhn, and all his students were ill with sore throats and upset stomachs. Irwin Spickler, a meteorologist, was in the plume for seven minutes on one occasion and at another time for fifteen minutes; while taking samples he always developed eye, throat and bronchial irritation. The last time he used a respirator and had almost as much irritation. The irritation lasted all day.

On May 31st, right after our first visit to Driftwood, Doctor Brewster of the Pennsylvania Railroad telephoned me regarding conditions among the railroad employees at Driftwood. He had a record of an undated report from the road foreman in the area mentioning that respirators had been purchased for the tower man and some of the crewmen, the latter of whom used the devices whenever trains passed through Driftwood. Doctor Brewster had no formal record of any illness reported from Driftwood. However, such reports could have been filed without having been brought to his attention. If it were urgent, he said, he would attempt to search for possible illness reports. I did not pursue that line of inquiry.

I received a letter from a visitor to Driftwood from Brookville, Pennsylvania, with her personal complaints. She concluded, "What good are laws if they are not enforced?"; a question which frequently occurs to all of us in environmental health work.

3. Thomas R. Bloom to Katharine R. Boucot [Sturgis], June 5, 1962.

As of July 9, 1962, Calvin Hugar's wife was back in Ridgeway Hospital. Her husband called me that afternoon to tell me that the fire was burning again and that Mrs. Hugar had had to leave town. Every day, with the exception of July 4th, that the state law against pollution was supposed to have been in effect, the fire had been "going real good." He had been told that the state was not proceeding with court action.

On July 13th, I had a note from Estella Sherry: "Do help us. We have more smoke than ever before."

On August 13, 1962, Hugar phoned me to advise that on August 11th the *Olean Times* and the *Bradford Era* had printed lies saying that the Health Department had ruled that the junkyard was not a menace to the health of the people. On Friday August 10th, the *Williamsport Grit* printed, "Problem Has Been Solved." Mister Hugar said that Doctor Wilbar, the State Commissioner of Health, had proposed a test site on state land where the metal wire would be burned for test purposes. Hugar read a letter to the Department of Forests and Water from Doctor Wilbar suggesting this test burning. Mister Victor Sussman, Director of the Division of Air-Pollution Control of the Health Department, agreed with the citizens of Driftwood that such a test had been going on in their town for the past three years. It was obvious that the fumes killed trees and made people sick; why should any more burning be allowed? Was Doctor Wilbar aware of this?

The people of Driftwood were increasingly irate about the lack of help from the state. The situation had finally come up in court in Harrisburg, and Doctor Jan Lieben had told me that the judge [Carl B. Shelley of Dauphin County] concluded his comments with, "Smoke never hurt anyone. I was raised in Steelton."

To some of the people who were phoning me at all hours of the day and night I recommended that, since the official agency seemed powerless, they should try to get some publicity against this open burning. The citizens reported on October 10th that the burning had been going on all day Saturday and for two days before. No one was able to sleep on Saturday night because the situation was so severe. The townspeople called the sheriff and the State Police before calling local officials, and were told, "You keep your nose out of our business. This is a civil offence, not a criminal offence." The sheriff told them there was no use in calling him. Hugar said that at 12:10 a.m. he decided to leave home. His family's throats were

burning and they could not sleep; they called the police, who said that they were unable to do anything.

On August 14th I was informed that the burning was heavy again; the same situation took place on August 16th. Doctor Lieben advised the community not to pass an ordinance against the burning; in all probability it would not do any good. The company began placing barbed wire around the plant on August 13th because the feeling of the community was so menacing. On August 28th, 1962, the plight of Driftwood was reported in the *Philadelphia Evening Bulletin*, in a full-length article by Stuart Brown headlined, "State to Argue Pollution Case in Court. Complaint Cites Wire Burning Firm in Cameron County." It went on to say:

> For the first time in the 13-year history of statewide air-pollution control, the State Health Department is engaged in a legal battle against a company.
>
> The case involves open burning of wire by a firm in Driftwood, Cameron County, about 255 miles northwest from here.
>
> Some persons in the small community (pop. 200) have complained to the Health Department that the company's activities have created a serious health hazard.
>
> An official of the company, the Metal Wire Recovery Corp., denied that the wire-burning is a health hazard. He said that the company has spent some $150,000 in a process to eliminate smoke from the company's works.
>
> The Health Department, aided by an on-the-spot, two day investigation by a Philadelphia physician [Doctor Sturgis], will seek a court injunction against the company's burning work.
>
> Metal Wire Recovery, which employs 114 persons, burns the insulation from old wire and salvages the residue, mostly copper, which it sells.
>
> The complaint against the company goes back more than two years, according to Victor Sussman, director of the division of air-pollution control for the Health Department. "This case," he said today, "is the only air-pollution case the Health Department has brought to court in the 13 years it has had an air pollution program. We have never had as serious a case as we feel we have here."
>
> Sussman said the type of burning process used by the company liberates plastic, polyvinyl chloride.
>
> The plastic itself is harmless, Sussman said.
>
> But . . . when it is burned, it gives off hydrogen chloride. This . . . mixes with moisture in the air and makes hydrochloric acid.
>
> When this gets into the respiratory tract, Sussman said, it can

> irritate the tract . . . a study made for the Health Department by Dr. Katharine R. Boucot, of Philadelphia, has "confirmed our evaluation that this is a serious problem."
>
> . . . Dr. Boucot, who is professor of preventive medicine at Woman's Medical College of Pennsylvania, would testify for the Health Department at a hearing Oct. 10 in Harrisburg.

John D. Gresimer, the attorney for the Metal Wire Recovery Corporation, said that the witnesses who testified at an earlier hearing in December 1960 said that there was no menace to health involved.

On September 10th, 1962, I wrote to the physicians in the Driftwood area as follows:

> Dear Doctor X,
>
> You have probably heard that at the request of the Pennsylvania State Department of Health I visited Driftwood in late May and interviewed quite a number of citizens. At that time I heard that the following patients were under your medical care: [names]. I am to testify in court on October 10th. I would like to have a brief medical summary on any of the above or other of your patients if in your opinion the smoke from the open burning has affected their health. Your reply will be appreciated.
>
> Sincerely. . .

Such letters went to Doctor Paul J. Valigorski of Force, Pennsylvania, Doctor Frank B. Dwyer of Renovo, Doctor John McKeon of Renovo, and Doctor James Minteer of Ridgeway. It was interesting to note that Mister Hugar told me that one of the physicians treating some of the Driftwood patients was on the board of the bank at Emporium—the very bank that was financing the operation of the Metal Recovery plant.

A very interesting reply was received from Doctor Frank Dwyer, dated September 8th, 1962, regarding patients exposed to the gaseous fumes enveloping the countryside.

> I first saw Mrs. Georgia Jordan on March 19, 1962, when she was suffering an acute attack of shortness of breath and an upper respiratory infection. She was acutely ill and was admitted to the Renovo Hospital the same day and discharged March 22nd, improving rapidly after her first day of hospitalization. She returned to her employment in Sinnamahoning and had a worse attack with the same

> symptoms on April 3, 1962 when she was readmitted to Renovo Hospital. Discharged symptom-free on April 9th, she again returned to work. On May 4th she suffered a violent attack and was again admitted to the hospital here. It took her until May 17th 1962 to get better this time. At this time I insisted that she not go back to Sinnamahoning so she gave up her work and moved out of the area. I have not seen her since but know she is still around this area, not returning to Sinnamahoning at any time. Her father, Thomas Jordan, was a patient in the local hospital until May 16th 1962 with similar symptoms and he too did not return to Sinnamahoning as far as I know. Both parents said that they had never had similar attacks before this spring and they attributed their illnesses to the fumes in the village that were undoubtedly the irritant causing the almost fatal illnesses of these two patients.

Quite different was a report from Doctor James Minteer. He stated that he could not in any way link the illnesses of his patient, Mrs. Mitchelltree, with inhalation of industrial fumes. She was an eighty year old suffering from hypertensive and arteriosclerotic heart disease, seen first by Doctor Minteer on August 15th, 1961. At no time during the lifetime of this patient did Doctor Minteer have any history that she worsened in any manner by inhaling smoke or fumes at her home in Driftwood, Pennsylvania. Mrs. Mitchelltree died on July 6, 1962, in ventricular flutter secondary to her cardiac condition.

He then summarized the situation of Mrs. Rhoda Fay Whitcomb, a forty-four year old woman seen in his office, March 26th and 27th, 1962. He stated that she suffered from mild arteriosclerotic heart disease. He had not seen her or heard from her since March 27, 1962, and at no time during her discussion with Doctor Minteer, while he was taking her history, did she offer any information as to the industrial fume situation in Driftwood affecting her as far as her general sense of well-being was concerned. Again Doctor Minteer stated unequivocally, "I do not feel that at that time Mrs. Whitcomb demonstrated any evidence of the smoke from the open burning having affected her health."

Then he went on to Mrs. Eunice Hugar.

> This patient on one occasion was apparently affected sufficiently by the smoke in the open burning at Driftwood to be brought directly to the Elk County General Hospital, Ridgeway, Pennsylvania, where she was seen immediately and I was fortunate enough to be able to do pulmonary function studies immediately at the time of admission and

> found there was some reduction in vital capacity. The patient was then washed out with oxygen and then kept at bed rest for 24 hours; [she] made an excellent recovery with marked improvement in pulmonary function studies within 24 hours after admission. It is my opinion that this patient was affected by the smoke and fumes from the open burning process in Driftwood.

Doctor Minteer next examined Calvin Hugar.

> This patient was seen several times with evidence of acute sinusitis which he states was worsened by heavy concentrations of both fumes and smoke in Driftwood. I had occasion to examine this man at one time after having spent approximately a week away from the exposure and there definitely was a decrease in symptoms of sinusitis. The nasal passages had reduced in color to a normal pink from their rather remarkable inflamed, reddened and edematous condition as they had been at the time of the examination. It is my opinion that possibly there was a factor as far as the upper respiratory tract and its symptoms were concerned. In other words that the fumes possibly caused some irritation and increasing of symptoms of his chronic sinusitis.

No reply was received from the other doctors.

On October 24, 1962, I made a telephone call to Doctor Frank Dwyer about Georgia Jordan. He said that severe attacks were connected with the smoke. The post office where she worked was right across the street from the open burning. Dwyer felt that the situation in town was "dreadful" because of the smoke. I reached Doctor Hackett, who had hospitalized Mister Hugar at St. Mary's Hospital but who could not demonstrate anything wrong with Hugar's lungs. Doctor Hackett said that the smoke would unquestionably bother Hugar's nose and throat; Doctor Hackett himself volunteered, "I hate like the dickens to live in it," but he was not sure that the smoke would cause lung damage. He said that people had told him that they were irritated at times even driving through Driftwood when the burning was going on. Next I telephoned Doctor John Dwyer, who said that he had not treated any patients who were involved with the smoke. He had not treated Calvin Hugar for five years. Doctor Dwyer carried out periodic examinations for the Pennsylvania Railroad. None of the men had mentioned the smoke to him. "No people whose jobs depend upon a medical examination volunteer anything wrong." John Dwyer thought that it was a fine thing that I was going to testify. He said, "It will give that little community a lift."

The state was accomplishing nothing and the town was absolutely beside itself with frustration. I advised the residents to engage a lawyer known to win his cases by any means possible and to get television, radio, and newspaper publicity. I volunteered to go up and appear for them at any time. I simply could not bring myself to believe that such a situation could go on in an American town. The community finally engaged Edward L. Woolf, from the Philadelphia law firm of Richter, Levy, Lord, Toll and Cavanaugh. To my amazement, they asked me if I would be their expert witness.

For my previous services, the state had paid me three hundred dollars, so I felt that it would be illegal for me to be engaged by a private law firm. However, I had become as upset as the community over the open burning, so I called my lawyer and he said, "Go ahead. No matter what happens I will defend you."

The law firm, unannounced, flew Doctor Heinrich Brieger of Jefferson Medical School and me up to Driftwood, where we visited the site. Doctor Brieger immediately said that pure hydrochloric acid was dripping from the rafters of the building. He was sure that that was the cause of all the irritation. The community had lined up a number of people for me to examine. Afterwards on September 28, 1962, Doctor Brieger sent me two references on the deleterious effects of hydrochloric acid.[4]

The situation had already taken its toll on the Calvin Hugar family. Back on July 30th, I had received a typewritten note from Calvin Hugar dated July 28th that stated,

> I would be glad to receive any information you could supply us in regard to the progress of the injunction. Time is growing short and I will soon need to know if I am going to resign from my teaching position. We are presently staying at the hunting camp because the doctor said my wife could not live in the smoke. If you call and cannot reach me at Driftwood 672, then try Frenchville, Amhurst 3-4438.

This note was particularly pathetic because Calvin Hugar was a high-school teacher who taught in Emporium but had lived in Driftwood for some time. He and his wife were devoted to the

4. Lawrence Turner Fairhall, *Industrial Toxicology*, 2nd ed. (Baltimore: Williams & Wilkins, 1957), p. 55; Allan James Fleming et al., *Modern Occupational Medicine*, 2nd ed. (Philadelphia: Lea and Febinger, 1960), p. 393.

community and had tried very hard to rectify things so that they could stay there. Now they were giving up hope; he was planning to resign his job as a high school teacher and to leave the area entirely.

On October 8th, in my own pencilled handwriting, I wrote a memorandum that Mrs. Calvin Hugar had advised me that she was deathly sick at that very moment. I told her that the state had ordered a cease and desist decree against polyvinyl chloride, but she said that the company had burned it continually. Everyone in Driftwood claimed that the firm was still burning polyvinyl chloride. Mister Hugar would have to give up everything if the burning continued.

On October 23rd, 1962, I sent a letter to Karl Mason, Director of the Bureau of Environmental Health of the Pennsylvania Department of Health, in reference to the Driftwood situation. I sent him a copy of a letter from a Driftwood citizen and advised him that it would be helpful if I knew the plans of the Department of Health before I undertook a personal crusade in the interest of the citizens of Driftwood. I remarked, "I believe their situation is the most disgraceful one I have encountered during my professional career. Earl Albrecht [Deputy Secretary of Health] told me this morning that something is planned by the people concerned with air pollution. However, I must answer Mrs. Hugar's letter so I would like specific information."

I sent copies of the letter to Doctor Lieben and to the Commissioner of Health, Doctor Charles Wilbar.

Eunice Hugar's letter of October 16th had read as follows:

> Dear Doctor Boucot,
>
> I am not sure it is proper for me to burden you with our problems but we feel it is useless to write to our health department. In other words we feel we have been "sold down the river" if we were to feel relieved and satisfied with the signing of the agreement between Metal Wire Recovery Corporation and the Health Department but we are not. We had hoped to be fully informed at our public meeting with Mister Victor Sussman. We know from past experiences just how reliable Mister Levin's [Alan Levin, President of the Metal Wire Recovery Corporation] promises are. After going through what we have been through for the past two years it is more than disheartening to find our health department taken in by another Levin promise. Up until last week there was absolutely no change in the heavy burning of vinyl. From Wednesday of October 10th until Sunday of October 14th there was a definite change but still a little vinyl burning each day. Then Monday, October 15th a larger pile was burned and the

fumes were very active from 11:25 a.m. to 12:50. Fumes lingered slightly until evening. About 9:45 another pile was lit in the open field. These fumes also came up stream to our home. Miss Georgia Jordan, who had come back to town after eight months on Levin's promise had to sit up all night in order to breathe. October 16th, no vinyl fumes this morning at 8:00 but heavy smoke haze. 10:55, fumes slight. At 11:25, a new pile of vinyl lit. A slight breeze to the north brought very thick smoke and vinyl fumes. My children informed me at 12:10 that fumes were heavy in the schoolhouse, during the afternoon hours there were times of partial clearing but tonight it is terrible again. The house is full of fumes and it is even worse outside. Mister Sid Kennedy [a member of the Citizens Committee on Air Pollution of Driftwood] who is to inform the Health Department is out of town today. Doctor Boucot, will you please let me know if there is any hope for relief from these fumes before December 31st? Were you able to get a copy of the minutes of the meeting in Harrisburg on October 5, 1962? Mister Sussman told us he could not distinguish one type of fume from another. I am certain if he had lived in Driftwood the past three years he would be able identify the vinyl fumes. Why won't the Health Department take our word for it when we tell them vinyl is being burned? How much longer will Mister Levin's word be heard above the citizens of Driftwood? If the Health Department is responsible for the latest release, "Driftwood Firm Stops Burning," I suggest they correct this statement immediately. Even though we have accomplished nothing with all our work, I wish to extend a special thanks to you, a very special person who cares.

Sincerely,
Eunice Hugar

Mrs. Hugar enclosed a clipping as well as a separate sheet in which she wrote,

When I talked with the school nurse this summer she told me she had never been in a Driftwood School when any of the children became ill from the fumes. In my opinion someone has told her to keep mum. Our school officials have never, as far as I know, shown any concern for the 50 students who sit in the Driftwood classrooms each school term.

Karl Mason answered my letter on October 30, 1962:

The Department of Health is quite concerned with the air pollution problem in Driftwood . . . We believe that the discontinuance of the open burning of polyvinyl chloride coated wire essentially satisfies my original complaint.

> An air pollution problem still exists at the plant from the burning of other types of coated wire, polyethylene, textile, rubber and paper. This operation is in violation of Regulation 2 of the Air Pollution Commission. On October 22, 1962, the Air Pollution Commision was informed that the company has not complied with its orders to abate this problem. This company has been summoned to appear at a hearing before the Commission on November 27, 1962. If this problem has not been satisfactorily abated, enforcement procedures will be instituted under the Pennsylvania Air Pollution Control [Act?] . . . I share your concern with the seriousness of this situation and can assure you that our Division of Air Pollution Control is extending every effort within its authority to have this consideration abated.

The local newspapers had announced on October 18, 1962, that the Metal Wire Recovery Corporation had agreed with the state to halt the burning of polyvinyl chloride insulated wire in the open at its plant site. Of course, the community denied that the corporation was living up to its promise.

The incredible Driftwood story may be summarized as follows: A ruthless entrepreneur set up a relatively small industrial operation in a small T-shaped valley in a virginal forest area of north-central Pennsylvania. The little town had about 200 residents. The operator of the Metal Wire Recovery Corporation arranged to have carloads of rejected telephone cable covered with polyvinyl chloride dumped on the ground, where he burned it to recover the copper wire. As protests about illnesses, worsening of existing illnesses, bleaching of trees in the valley, diminished visibility, and acid etching of metal screens, furniture, etc., increased, the owner first shifted to the use of kettles and finally moved out of town when the populace became menacing after several years of peaceful, fruitless protest and legal suits that never came to a hearing. Alan Levin shifted his operations from town to town. When I gave a talk at Huntington, Pennsylvania, a nurse in the audience spoke of the man burning material indoors in a plant at that locality. Later I received a letter dated September 4, 1965, from George C. Mosch, a physician in Coudersport, Pennsylvania.

> During July 1965 I attended the symposium on respiratory diseases at Saranac Lake. You gave a talk on air pollution and health and mentioned the conditions of the wire recovery operation carried out at Driftwood, Pa. You stated that it was your impression that they had gone out of business and I remarked to you that I had a patient who was a truck driver for the company. Since I have returned I had

> an opportunity to discuss this matter with my patient. He had said the company is definitely in operation yet. They have moved the wire burning process out of the community of Driftwood to a relatively isolated area utilizing some abandoned mines at an area called Liberty which is somewhere between Driftwood and Keating Summit. He states that he has inhaled the material in the air from this process of burning the wire covering and that it has irritated him severely; however, as a truck driver his exposure is relatively limited and since there is no settled or populated area in the vicinity of these mines it is apparently not now a serious health hazard.

I have tried unsuccessfully to find out whether Metal Wire Recovery Co. is still burning wire, but I have no way of determining this matter at the present time. Obviously this company never took steps to combat the serious health problems it had created and never sought medical advice for its employees or for its citizen neighbors. When Doctor Heinrich Brieger—now deceased, formerly head of Occupational Medicine at Jefferson Medical College—went with me to Driftwood at the request of the law firm that the citizens had finally engaged on their own, he put his finger to some of the condensed moisture on the partially open buildings that were then in use; he said at once that the material was hydrochloric acid. This was confirmed by several reports we received from the families of employees about eye burns suffered by the men from the dripping material from the ceilings.

The interaction among the bank, the entrepreneur, the board of directors of the bank (including a local physician), and the miserable citizens of Driftwood seems more characteristic of mid-nineteenth century America than of the supposedly enlightened twentieth century. Only the vigilance of citizens, physicians, and state officials, coupled with an enlightened capitalism on the part of entrepreneurs not willing to sacrifice the public good for personal gain, will keep another Driftwood situation from developing within our state.

Cathedral Village 417
600 East Cathedral Road
Philadelphia, PA 19128

A Roman Declamation on Vivisection*

GARY B. FERNGREN

THE extent to which ethical considerations were taken into account in medical experimentation in Greece and Rome is a subject on which little available evidence exists.[1] That experiments were carried out on human subjects, if not systematically at least occasionally, is well known.[2] Generally, however, medical experimentation, whether for scientific or therapeutic purposes, failed to provoke much discussion of the ethics of the practice either among lay or professional writers. Pliny, whose attitude toward physicians was generally hostile, stated that "physicians acquire their knowledge from our dangers, making experiments at the cost of our lives."[3] He did not support his generalization by examples. Galen recognized that rash experimentation creates danger to the life of the patient.[4] An exception to the general silence of our sources regarding the ethics of medical experimentation concerns the practice of vivi-

1. On medical experimentation see G.E.R. Lloyd, "Experiment in Early Greek Philosophy," *Proceedings of the Cambridge Philological Society* n.s. 10 (1964): 50-72, esp. 66 ff.; and "The Role of Medicine in the Development of Early Greek Science," *Lampas* 8 (1975): 327-33.

2. See Ludwig Edelstein, "The History of Anatomy in Antiquity," in *Ancient Medicine*, edited by Owsei and C. Lilian Temkin (Baltimore: Johns Hopkins University Press, 1967), pp. 247-301; and *infra* n. 25.

3. *Natural History* 29. 8. 18. (translated by W.H.S. Jones, Loeb Classical Library [London: William Heinemann, 1963]).

4. *In Hip. de humor. com.* 1. 8.

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section. According to Celsus[5] vivisection was practiced in Alexandria by Herophilus and Erasistratus (fl. third century B.C.) on criminals who were supplied by the king for this purpose. They were cut open while alive "and whilst these were still breathing, [Herophilus and Erasistratus] observed parts which beforehand nature had concealed, their position, colour, shape, size, arrangement, hardness, softness, smoothness, relation, processes and depressions of each, and whether any part is inserted in or is received into another."[6] The charge that vivisection of human subjects was practiced in Alexandria in the third century B.C. was repeated by Tertullian[7] and Augustine.[8] Whether it is true has been much debated in modern times.[9] It is not difficult to understand why the alleged practice of vivisection should excite much emotionally charged discussion. Aristotle, who was probably the first Greek scientist to dissect animals on a systematic basis,[10] noted that "it is not possible without considerable disgust to look upon the blood, flesh, bones, blood-vessels, and such-like parts of which the human body is constructed."[11] This attitude of revulsion, which affected even the practice of dissection, naturally affected the practice of vivisection.[12] The greatest objection, of course, was its cruelty. Tertullian described Herophilus as "that doctor or butcher

5. *De Medicina*, Prooemium 23 ff. (translated by W.G. Spencer, Loeb Classical Library, vol. 1 [London: William Heinemann, 1935]). The translations of Celsus used in this article are taken from the Loeb edition.

6. *Ibid.*, Prooemium 24.

7. *De anima* 10 (ed. with Introduction and Commentary by J.H. Waszink [Amsterdam: North Holland Publishing Co., 1947]). Waszink believes that Tertullian derived his information from Soranus (see pp. 22-29 and 185).

8. *De anima et eius origine* 4, 3, and 6.

9. See John Scarborough, "Celsus on Human Vivisection at Ptolemaic Alexandria," *Clio Medica* 11 (1976): 26-27, for a list of scholars on both sides of the debate.

10. See G.E.R. Lloyd, "Alcmaeon and the early history of dissection," *Sudhoffs Archiv: Zeitschrift für Wissenschaftsgeschichte* 59 (1975): 113-47, esp. 142.

11. *De Part. An.* 645 a 28 ff. (translated by A.L. Peck, Loeb Classical Library [London: William Heinemann, 1937]).

12. Celsus, *De Medicina*, Prooemium 44, says of dissection, "although not cruel, it is none the less nasty" (*quae etsi non crudelis, tamen foeda sit*).

who cut up innumerable corpses in order to investigate nature and who hated mankind for the sake of knowledge."[13] Celsus used language that is more restrained: "But to lay open the bodies of men whilst still alive is as cruel as it is needless."[14]

In spite of the popular antipathy against vivisection, ancient opinion regarding its propriety was divided between the medical sects of the Dogmatists and the Empiricists, the former favoring the practice and the latter opposing it. Celsus described the leading doctrines of the Dogmatic school as "first, a knowledge of hidden causes involving diseases, next of evident causes, after those of natural actions also, and lastly of the internal parts."[15] Because of their belief that a knowledge of the internal organs was necessary before treatment could be given, they recommended dissection and vivisection: "For when pain occurs internally, neither is it possible for one to learn what hurts the patient, unless he has acquainted himself with the position of each organ or intestine; nor can a diseased portion of the body be treated by one who does not know what that portion is. When a man's viscera are exposed in a wound, he who is ignorant of the colour of a part in health may be unable to recognize which part is intact, and which part damaged; thus he cannot even relieve the damaged part. External remedies too can be applied more aptly by one acquainted with the position, shape and size of the internal organs, and like reasonings hold good in all the instances mentioned above. Nor is it, as most people say, cruel that in the execution of criminals, and but a few of them, we should seek remedies for innocent people of all future ages."[16]

The Empiricists, by contrast, while accepting evident causes, refused to seek hidden causes on the ground that "nature is incomprehendable"(*quoniam non comprehensibilis natura sit*).[17] Since the widest disagreements existed between rival philosophers and physicians regarding the nature of hidden causes, they avoided

13. *De anima* 10.

14. *De Medicina*, Prooemium 74.

15. *Ibid.*, Prooemium 13.

16. *Ibid.*, Prooemium 25-26; cf. also 23.

17. *Ibid.*, Prooemium 27.

theory and sought to base treatment on experience.[18] Experience revealed which treatment had succeeded and which had failed.[19] Hidden causes were regarded as too conjectural: "it does not matter what produces the disease but what relieves it. . . ." Conjecture regarding the cause of a disease leads to useless debate, whereas practice enables a physician to treat a disease adequately.[20] "Now the matters just referred to they deem to be superfluous; but what remains, cruel as well, to cut into the belly and chest of men whilst still alive, and to impose upon the Art which presides over human safety someone's death, and that too in the most atrocious way. Especially is this true when, of things which are sought for with so much violence, some can be learnt not at all, others can be learnt even without a crime. For when the body had been laid open, colour, smoothness, softness, hardness and all similars would not be such as they were when the body was untouched; because bodies, even when uninjured, yet often change in appearance, they note, from fear, pain, want of food, indigestion, weariness and a thousand other mediocre affections; it is much more likely that the more internal parts, which are far softer, and to which the very light is something novel, should under the most severe of woundings, in fact mangling, undergo changes. Nor is anything more foolish, they say, than to suppose that whatever the condition of the part of a man's body in life, it will also be the same when he is dying, nay, when he is already dead; for the belly indeed, which is of less importance, can be laid open with the man still breathing; but as soon as the knife really penetrates to the chest, by cutting through the transverse septum, a sort of membrane which divides the upper from the lower parts (the Greeks call it διάφραγμα), the man loses his life at once: so it is only when the man is dead that the chest of any of the viscera come into the view of the medical murderer, and they are necessarily those of a dead, not of a living man. It follows, therefore, that the medical man just plays the cut-throat, not that he learns what our viscera are like when we are alive."[21] The Empiricists held that any useful anatomical

18. *Ibid.*, Prooemium 28-32.

19. *Ibid.*, Prooemium 32-35.

20. *Ibid.*, Prooemium 37-39.

21. *Ibid.*, Prooemium 40-43.

observation could be made when the opportunity presented itself, e.g., by viewing a wounded gladiator, soldier, or traveller set on by highwaymen. "Thus, they say, an observant practitioner learns to recognise site, position, arrangement, shape and such like, not when slaughtering, but whilst striving for health; and he learns in the course of a work of mercy, what others would come to know by means of dire cruelty."[22] Celsus, who was neither a Dogmatist nor an Empiricist,[23] agreed with the Empiricists' objection to vivisection: "but to lay open the bodies of men whilst still alive is as cruel as it is needless; that of the dead is a necessity for learners, who should know positions and relations, which the dead body exhibits better than does a living and wounded man. As for the remainder, which can only be learnt from the living, actual practice will demonstrate it in the course of treating the wounded in a somewhat slower yet much milder way."[24]

We shall probably never know whether, in fact, the charges that Herophilus and Erasistratus practiced vivisection are true. Whether or not they did, it is unlikely that circumstances would have permitted vivisection to be performed more than rarely for medical or scientific purposes.[25] Nevertheless, because of its sensational

22. *Ibid.*, Prooemium 43.

23. See Owsei Temkin, "Celsus' 'On Medicine' and the Ancient Medical Sects," *Bulletin of the Institute of the History of Medicine* 3 (1935): 249-64, esp. 257-62.

24. *De Medicina*, Prooemium 74-75.

25. "They could only be performed where an authoritarian state interested in science provided the means for them, and for this reason they were performed only in Alexandria and at the beginning of the Hellenistic period, as Celsus tells" (Ludwig Edelstein, "The History of Anatomy in Antiquity" [*supra*, n. 2], p. 297). P.M. Fraser has argued that Erasistratus did not practice in Alexandria, but worked in Antioch ("The Career of Erasistratus of Ceos," *Rendiconti dell' Istituto Lombardo di scienze e lettere* 103 [1969]: 518-37), where, he believes, "there would be nothing surprising if the Seleucid court emulated the Ptolemaic in this as in other respects" (*Ptolemaic Alexandria* [Oxford: Clarendon Press, 1972], vol. 1, p. 349). As G.E.R. Lloyd has pointed out, however, ("A Note on Erasistratus of Ceos," *Journal of Hellenic Studies* 95 [1975]: 172-75, esp. 175), this is unlikely and it is probable that it was only in Alexandria that dissections (and perhaps vivisections) were carried out. The practice of mummification may have had some influence in reconciling Egyptians (and Greeks in Egypt) to the idea of dissecting the human body. Galen states that Mithridates VI of Pontus and Attalus III of Pergamum tested antidotes to poisons on condemned criminals (*De Antidotis* 1. 1), but this was hardly for the purpose of medical research and is therefore not strictly

nature, the subject seems to have exercised a peculiar fascination over a number of ancient writers on medical subjects, both lay and professional. Evidence of a lay interest in vivisection is furnished by an interesting document whose bearing on the controversy seems to have escaped the attention of modern scholars: the Pseudo-Quintilian Declamation 8.[26] The piece is a rhetorical exercise, one of nineteen *declamationes maiores*, which, along with 145 shorter such exercises (*minores*), are ascribed in the manuscripts to Quintilian, the well-known first-century rhetorician. Most scholars reject the attribution, dividing the authorship of the collection amongst four or more authors of varying dates.[27] Declamations were oratorical practice-exercises on invented themes used by students in Roman schools to train for a career in politics or the law courts. They were of two kinds: *suasoriae*, or deliberative orations, in which the speaker deliberated a course of action; and *controversiae*, or judicial orations, in which the speaker debated some fictitious case in court. The stock themes are far-fetched and often of a romantic nature, designed to produce ingenuity in pleading.

The Pseudo-Quintilian Declamation 8 is a *controversia* that deals with a typically fantastic theme. Two brothers who were twins became ill. The physicians who were consulted said that they had the same disease but offered no hope for them. One physician,

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comparable. A late source (Johannes Alexandrinus [fl. 7th c. A.D.], in his commentary on Hippocrates' *De Nat. Pueri*, in Dietz, *Schol. Vet. in Hipp.* 2, p. 216) states that Galen and Archigenes practiced vivisection (the passage is quoted by P.M. Fraser, *Ptolemaic Alexandria*, vol. 2, pp. 506 f., n. 70), but it is clear from Galen's own testimony that he did not perform vivisections. There is, however, a reference to physicians' vivisecting a Christian for the sake of anatomical knowledge (see Owsei Temkin, "Byzantine Medicine: Tradition and Empiricism," *Dumbarton Oaks Papers* 16 [1962]: 107, n. 69; reprinted in *The Double Face of Janus* [Baltimore: Johns Hopkins Press, 1977], pp. 202-22).

26. Text edited by G. Lehnert in *Quintiliani quae feruntur declamationes (maiores)* (Leipzig: Teubner, 1908). There is an English translation by J. Warr, *The Declamations of Quintilian* (from the Oxford Theatre Edition, London, 1686), pp. 190-218. All translations quoted in this article are my own. The only discussion I can find of its relevance is by D.W. Amundsen, "The History of Medical Ethics: Ancient Greece and Rome," in *The Encyclopedia of Bioethics* (New York: The Free Press, 1978), vol. 3, p. 935.

27. See J. Wight Duff, *A Literary History of Rome in the Silver Age*, 3rd ed., edited by A.M. Duff (London: Ernest Benn, Ltd., 1964), pp. 331-32, for a brief discussion and bibliography.

however, promised that he could cure one of the twins if he would be allowed to vivisect the other. The father granted permission and the physician cut up the child and examined his organs. The other brother recovered and the father is charged by his wife with murder. The declamation takes the form of a speech delivered by the prosecution in court. In spite of the manifestly improbable theme of the declamation, it is of particular interest in being the most detailed discussion that we have in ancient literature on the subject of vivisection. Moreover, though it is merely a rhetorical exercise on a fictional event, it reveals a good acquaintance with the debate between the medical sects regarding vivisection. The author seems to be familiar with the arguments of the Dogmatists in favor of the practice and those of the Empiricists against it. The declamation contains a good deal of tedious rhetorical excess and melodramatic pathos, while at the same time it discusses at length the ethical considerations regarding vivisection that were debated by both the medical sects and the lay public.

In the Graeco-Roman world, laymen were much interested in medical subjects and often displayed what to us seems to be a remarkable knowledge of anatomy and of the subjects that were discussed between the representatives of the medical sects. In a well-known passage[28] Aristotle wrote, "But 'physician' means both the ordinary practitioner, and the master of the craft, and thirdly, the man who has studied medicine as part of his general education."[29] Medicine was popular as a subject of "general education."[30] Athenaeus, a physician of the first century, is quoted by Oribasius as stating that

28. *Politics* 1282 a 3 f. (translated by H. Rackham, Loeb Classical Library [London: William Heinemann, 1932]).

29. Cf. Aristotle, *De Part. An.* 639a 1: "There are, as it seems, two ways in which a person may be competent in respect of any study of investigation, whether it be a noble one or a humble: he may have either what can rightly be called a scientific knowledge of the subject; or he may have what is roughly described as an educated person's competence, and therefore be able to judge correctly which parts of an exposition are satisfactory and which are not. That, in fact, is the sort of person we take the 'man of general education' to be; his 'education' consists in the ability to do this" (translated by A.L. Peck, Loeb Classical Library). Cf. Plato, *Protagoras* 312b.

30. See Fridolf Kudlien, "Medicine as a 'Liberal Art' and the Question of the Physician's Income," *Journal of the History of Medicine and Allied Sciences* 31 (1976): 448-59, esp. 450-51.

no person of importance or responsibility should be ignorant of a general knowledge of medicine.[31] From the time of the sophistic movement in the fifth century B.C. medicine was often the subject of rhetorical debate. The writer of the Hippocratic treatise *On the Nature of Man* refers to debates on scientific and medical subjects and says that the victory went to the man with the most glib tongue (chap. 1). In the *Gorgias* (456), Plato alludes to the possibility of medical subjects being debated in public before the Athenian assembly who are about to elect a state-physician. Lay interest in medicine was still active in Galen's time, for he records instances of physicians who promised that they could exhibit an artery empty of blood by publicly vivisecting animals and were challenged to do so before an audience.[32] Throughout antiquity, in fact, we find a good deal of enthusiastic amateur interest in medical subjects, and lay writers produced treatises to appeal to this popular taste. A demand arose for laymen's guides to health and hygiene that led to the production of such works by physicians (e.g., Galen's *Hygiene*) as well as laymen (e.g., Plutarch's *De sanitate tuenda praecepta*). A number of the treatises in the Hippocratic Corpus show signs of having been composed by sophists rather than by professional physicians. This is suggested by their agonistic character, their rhetorical style, and their interest in speculative philosophy.[33] It has been much disputed whether Celsus was a physician.[34] I am inclined to agree with Duff that "one notices nothing in him that a vigilant eye and a perusal of medical books might not have yielded."[35] A learned encyclopedist

31. Oribasius 3. 168 Daremberg. On the background of this passage see Ludwig Edelstein, "The Dietetics of Antiquity," in *Ancient Medicine*, 303-16.

32. See Galen, *On Anatomical Procedures* (translated by C. Singer [London: Oxford University Press, 1956]) 7, ch. 16. Cf. Plutarch's mention of physicians' performing operations in a theater with an eye to attracting patients (*Moralia* 71a).

33. See W.H.S. Jones' introduction to the Loeb edition of Hippocrates, vol. 2 (London: William Heinemann, 1923), pp. xlii-xliii; and G.E.R. Lloyd, "The Role of Medicine in the Development of Early Greek Science"(*supra*, n. 1), 327-28.

34. See *pro*, W.G. Spencer, in the Loeb edition of Celsus, vol. 1, xi-xii; *contra*, Sir T. Clifford Allbutt, *Greek Medicine in Rome* (1921; reprinted, New York: Benjamin Blom, 1970), 203-5.

35. *A Literary History of Rome in the Silver Age*, 95. Pliny the Elder, in citing his sources for the *Natural History*, lists Celsus among the *auctores* rather than among the *medici*.

and layman, he wrote for lay people who wished to treat themselves, or judge the treatment a physician gave them, or simply to obtain information.[36]

A close connection between rhetoric and medicine existed in antiquity that goes back to the fifth century B.C. Not only might a physician find oratory of value in persuading patients to accept his advice or treatment; but because of the general interest in medicine, the subject was often one of lively debate amongst both practitioners and laymen.[37] Hence it is not surprising that one often finds medical topics treated in rhetorical exercises, such as the declamations that were employed in Roman schools to train pupils in oratory. Quintilian cites the following typical example: "A man who had been disinherited by his father took to the study of medicine. His father fell sick and, his life being despaired of by the other doctors, the son was called in, and said he would cure him if he would take a draught prescribed by himself. The father after drinking part of the draught said that he had been poisoned: the son drank the remainder of the draught. The father died and the son is accused of parricide."[38] There is no doubt that certain medical themes, such as poisoning, lent themselves especially well to treatment in the declamations and they appear frequently. Physicians, poisoning, and a variety of medical topics abound, for example, in the *declamationes minores* ascribed to Quintilian,[39] the *controversiae* of the elder Seneca,[40] and the declamations of Calpurnius Flaccus.[41]

The anonymous author of Declamation 8, which deals with the vivisection of a twin, displays an evident familiarity with the teachings of the major medical sects. One recognises in the declamation the Empiricist polemic against medical experimentation: the

36. Cf. Temkin, "Celsus' 'On Medicine' and the Ancient Medical Sects" (*supra*, n. 23), 252.

37. See Ludwig Edelstein, "The Hippocratic Physician," in *Ancient Medicine*, 100-101.

38. *Institutes* 7. 2. 17-18.

39. See, e.g., 246, 268, 321, 350, 380.

40. See, e.g., Book 3, contr. 7; Book 4, contr. 5; Book 6, contr. 6 and 7; Book 8, contr. 29.

41. See. e.g., *Declamationes* 12 and 13.

opposition to enquiry into hidden causes, the incomprehensibility of nature, the deprecation of theory and the "vanity of debate," and a reliance on the comparison of similar and dissimilar cases rather than on the employment of vivisection. It is wrong, he writes, to sacrifice the life of a man for the good of the human race. One cannot use the excuse that the death of one will provide health for others. If that excuse is accepted it will be possible to vivisect anyone by arguing, "in order that I might discover the causes of his ill-health, give me another body, other vital organs, and I shall kill. Then I shall enquire about the remedies and consider what will be beneficial." An easier method is to gain familiarity with the disease. Since the disease spreads from the vital organs throughout the body, it is not necessary to examine the organs themselves. "I do not know why you examine a man by making incisions, why you also dispatch medicines by means of the vital organs throughout the body, and why medicine probes in hidden passages through those things by which we are protected." Nature conceals the kinds of disease in the inner organs and sickness does not admit of understanding its causes. One should rather examine symptoms, such as the rapidity of the pulse or shortness of breath. "Trust in these senses above all — in your own eyes — and ask those who are afflicted, sometimes by themselves, sometimes together with others, in which part of the body the most prominent and serious pressure of hidden disease appears, from which an accompanying pain produces groaning. A physician who in this way is not able to find the disease does not find the remedy either. What if medicine can perform something for an individual who is healed? Is it reason enough that indeed sometimes by making an examination of one man, medicine helps to understand all of nature? What is he going to learn to help this sick person which the experiences of so many generations and so many sick people have not learned?"(chaps. 16-17).

A further argument against vivisection is that the very act of cutting open a human being affects the human body in such a way as to alter what is being sought by experiment. "Do you think it possible that exposed vital organs retain their own appearance, that nothing destroys that mystery of the heart and life that exists in its previous nature, when they have been exposed to sight?" Even changes in one's disposition, caused by grief, fear, joy, or anxiety, influence sickness. *A fortiori* vivisection will affect the subject. A sickness itself gradually dies with the body. "If the illness can be

ascertained while he is dying, it can be more easily ascertained when he is dead" (chap. 18). The argument that the vital organs are affected not only by death but even by physical and emotional changes (and that vivisection is therefore both useless experimentally and cruel) was used by the Empiricists to support their opposition to vivisection.[42]

The role of medicine is said to be modest: to observe diseases, to practice what will be beneficial. But the enquiry into the hidden causes of disease is not of concern to the art of medicine. "Whence does it know how much nature has granted to the unique soul between the entrails and the hidden fold of the breast, how it has perceived the property of the spirit and the body? There are not such diverse likenesses among mortals, nor in our appearances does such a great diversity exist, as the difference that remains hidden in our vital organs themselves. It is indescribable, it is undiscoverable, what various collocations of elements have shaped us. And just as very many, though perhaps rather scattered, things of earthly and heavenly origin have come together in us, so we are continued in life or we are released from it through inscrutable reason"(chap. 11).

The Methodist sect became fashionable in Rome in the first and second centuries after Christ; hence it is not surprising to find the author of the Declamation indebted to Methodist doctrine in his discussion of both causes and treatment of disease.[43] The Methodists believed that it is unnecessary to know either which part of the body is diseased or what caused the illness. The age and constitution of the patient were of no importance. The physician could learn what he needed to know from the symptoms alone. Celsus writes that according to Themison, whose teaching the Methodists acknowledged as the source of their "method," "knowledge of a disease is outside the Art, and medicine is confined to practice."[44] It was considered sufficient to observe certain general characteristics of disease. There were only three classes: a constriction or dryness of the body, a flux,

42. See Celsus, *De Medicina*, Prooemium 40-43 (quoted *supra*, p. 275).

43. On the Methodist sect see Ludwig Edelstein, "The Methodists," in *Ancient Medicine*, 173-91; Clifford Allbutt, *Greek Medicine in Rome*, 192-201; and Harris L. Coulter, *Divided Legacy: A History of the Schism in Medical Thought*, vol. 1 (Washington: Wehawken Book Co., 1975), 291-301.

44. *De Medicina*, Prooemium 64.

and a mixed condition.[45] "They [the Methodists] hold that the Art of Medicine consists of such observations; which they define as a sort of way, which they name μέθοδος, and maintain that medicine should examine those characteristics which diseases have in common."[46] Treatment consisted of the physician's attempting to induce an opposite condition in the patient. "Once it has been recognised, then, which it is of these, if the body is constricted, it has to be relaxed; if suffering from a flux, that has to be controlled; if a mixed lesion, the more severe malady must be countered first."[47]

The writer of the Declamation suggests that there is a shorter road to human health than enquiring after the "mysteries" of illness by means of vivisection. It consists in the application of remedies that are recognizably Methodist both in treating the whole body and in employing *contraria contrariis*. "If the rather excessive heat of the internal organs has hardened the body's members, which have been tightly bound around themselves, apply relaxing remedies. If a sick man has too much of a flow of fluids (humours), let those things be applied through which, when the veins have been controlled and closed up, the body will become dry and gain new strength. If abstinence is of little use, then attention ought to be given to the properties of food. If respiration is restricted by the nourishment which is received, freer breathing should be permitted by fasting and diet"(chap. 17).

Another feature which the Methodist school shared with other sects is the insistence that the object of medicine is the individual patient. Although the Methodists taught that treatment does not depend on the patient's age or constitution, and that the physician need only observe certain general conditions of the body, they recognized with the Empiricist and Dogmatic schools that treatment might vary according to the individual patient. But they were interested only in general conditions and learned from the symptoms whatever seemed useful to them. Hence they saw no need for anatomical knowledge. This emphasis on the individualization of treatment appears in the Declamation as an argument against

45. *Ibid.*, Prooemium 54-55.

46. *Ibid.*, Prooemium 57.

47. *Ibid.*, Prooemium 56.

vivisection. "There is no reason for wounds, for blood, for death. How another sick person ought to be cured you could not know except from a man who has been cured. Why? Because even when the nature of the sickness is the same, it is, nevertheless, necessary for it to be varied by the difference between two bodies. Never would you find in another's vital organs wholly what you seek from someone else; and there is a different sickness and a different sick person." The physician who examined the twins had an excellent opportunity for experimentation, since he was treating two sick men in the same condition. In place of vivisection he could have alternated various kinds of treatments, testing "the same things as well as harmonious, different, and contradictory things" that would not be beyond the endurance of one man (chap. 17). Presumably the kind of experimentation that is spoken of here involves largely dietetic treatment (and perhaps also baths, purgatives, massage, and exercise), which were the therapeutic measures commonly recommended by the Methodists and other sects that adapted their treatment to the individual.

The need for individualized treatment is demonstrated in an interesting discussion of the difference in the health of twins. The father had argued that since the brothers were twins they must have had the same disease. The prosecutor observes in reply that anyone who does not know what kind of disease it is cannot know that both twins had the same disease. Furthermore, "it is a law of nature that there is nothing in human affairs which is so alike that it is not distinguished by some quality." Even twins are individuals and each has its own destiny. Although they appear alike, each has distinguishing characteristics that can be recognized by parents and nurses: a different voice or gait, different opinions or characters or manners of life. Moreover, fate often deals out different things: one lives in poverty, another experiences unexpected wealth; one receives honors and offices, another lives in obscurity. "Whatever twins receive from man is similar; whatever they receive from fate is dissimilar." The reason for their different fate is that, though conceived at the same time, they are born at different times, and therefore under different stars. The interval that separates their birth, although short, produces different fortunes. That they were not ill by the same fate (and therefore did not have the same disease) is demonstrated by the fact that both did not die and both were not cured (chaps. 12-13). This passage is similar to the well-known

discussion by St. Augustine in the *City of God* of the influence of the stars on the health of twins.[48] In his discussion of astrology Augustine makes reference to a case recorded by Hippocrates of two brothers who were thought to be twins because they both became ill simultaneously with a disease that reached its crisis and subsided at the same time. Posidonius had explained the similarity as being due to their having been born under the same constellation. Augustine argues, citing Nigidus' parable of the potter's wheel, that even though the twins were born within a short interval of each other, the rapid motion of the celestial sphere would ensure that a great distance was travelled in that interval of time. He uses the illustration of Esau and Jacob to demonstrate a dissimilarity in the fortunes of twins. The diverse fate of twins was a commonplace in Roman literature (cf. Cicero, *De Div.* 2. 90 and Origen, *Philocalia* 23.18), which the author of the Declamation has employed as an argument against the value of vivisection and in favor of treatment that recognizes the uniqueness of the individual.

There is an underlying polemic against physicians that runs throughout the Declamation. Many rhetorical exercises depict physicians in an unfavorable light, often employing them, for example, as poisoners. One finds in much Roman literature evidence of general hostility towards the medical profession.[49] The physicians who first examined the twins, says the prosecutor, agreed that both would die since their sickness was the same. They did not speak the truth in the matter, clearly, since one recovered. Their despair of recovery was preferable, however, to that of the physician who claimed that he could cure the one by vivisecting the other. It was an honest admission of ignorance and they entrusted the twins to their parents, admitting that they did not know the causes of the disease. "Less harmful is the candour to despair if you do not know the remedies; and I prefer this honest admission of ignorance provided only that you deny to be able to cure the sickness with which you are unacquainted. Humane feeling would not belong to the greatest of these men, especially to those who evade the obligation of their art, if they know this kind of healing and do not wish to disclose it" (chap. 3). The first two physicians in this instance

48. *City of God* 5. 2-6.

49. See Darrel W. Amundsen, "Images of Physicians in Classical Times," *Journal of Popular Culture* 11, n. 3 (1977): 643-55.

would have followed the usual practice of classical physicians and refused to treat cases that were regarded as hopeless in the belief that medicine is powerless to help.[50] The chief motivation for a refusal to treat an incurable patient was concern for the reputation of the physician. Celsus summarizes the prevailing sentiment: "In this connexion, however, a practitioner should know above all which wounds are incurable, which may be cured with difficulty, and which more readily. For it is the part of a prudent man first not to touch a case he cannot save, and not to risk the appearance of having killed one whose lot is but to die; next, when there is grave fear without, however, absolute despair, to point out to the patient's relatives that hope is surrounded by difficulty, for then if the art is overcome by the malady, he may not seem to have been ignorant or mistaken."[51]

Later in the Declamation, however, the prosecutor attacks the physicians who refused to treat the twins for their "arrogant conviction" that the case was incurable. The father has argued that these physicians offered no hope for the two. But physicians have no right to make such absolute claims. "By fate we live, we are sick, we recover, we die. Medicine, why are you pre-eminent except that no one despairs in your presence? You think that I am going to say that I do not trust those who make a report, that I do not accept it when they despair, when they abandon them in ill health. Indeed I do not even trust doctors who offer hope. Look at the greater part of the human race. . . . It knows no practitioners of this art. Nevertheless, it heals the wounds of wars and the attacks of diseases, not with the skillful vanity of debate, but with experiences and through the alternation of similar and dissimilar cases; and with the guidance of observation it gives aid through reason which has been given to it. It is not medicine that heals, but whatever seems to have healed is medicine." What should one think of an art that strives for the authority to foretell death, that attempts to equal the greatest science, but cannot heal? "If we wish to estimate the frailty of human nature and its uncertain accidents, every sick person faces just so much danger. It is most unfair to call those helpless whenever medicine does not find a cure for them, and to refer difficulties,

50. See Darrel W. Amundsen, "The Physician's Obligation to Prolong Life: A Medical Duty without Classical Roots," *The Hastings Center Report* 8, n. 4 (1978): 23-30.

51. *De Medicina* 5. 26. 1 C.

whether of the art or of the human mind, to the displeasure of the fates" (chaps. 9-10).

There follows a moving plea not to despair of life even in the case of the seriously ill. "I think that nothing is of more importance for everyone than the realization that hope for a man lasts as long as life. Why do we disturb funeral processions with loud lamentation and continual great noise and wailing, if not because it would seem a crime to believe so easily in death? We often see, therefore, those returning to life having been mourned for the last time; and many have recovered from illness through benign neglect. That which sets some free would perhaps kill others; some the temerity of kindness helps, others the boldness of despair" (chap. 10). This denunciation of physicians who refuse to take on a dangerous case may well represent a popular criticism of doctors who used unfavorable prognoses to excuse themselves from treating patients for whose death they might be blamed. Celsus deals with this charge. After a long discussion of changes in a patient's condition, some of which anticipate death, he raises the question what certainty can be given to prognostic signs. "I know that on this point someone may question me: if there are such sure signs of approaching death, how is it that patients who have been deserted by their medical attendants sometimes recover? And rumour had spread it about that some have revived whilst being carried out to burial." His answer is that some signs, which seem certain, "often deceive inexperienced practitioners, but not good ones. . . . and it is not a fault of the art if there is a fault on the part of its professor." The art of medicine is conjectural, and conjectures are usually correct but sometimes are deceptive. This is true not only of noxious signs, but of salutary ones as well. Nevertheless, Celsus is confident that prognostic signs are ordinarily to be trusted and that they benefit by far the greatest number of those who are ill.[52] There must have been many, however, who were refused treatment by physicians whose prognosis suggested that the case was incurable. They will have been more dubious than Celsus of the benefits of such a prognosis.

Even more strongly condemned in the Declamation than the refusal of physicians to treat a case which they have pronounced incurable is the desire of the physician who vivisected one of the twins to experiment on the life of a patient. Here again we see what

52. *Ibid.* 2. 6. 13-18.

must have been a common Roman lay perception of the medical profession, which is expressed by Pliny the Elder in his remark that "physicians acquire their knowledge from our dangers, making experiments at the cost of our lives."[53] The objection involves more than merely an opposition to vivisection. It is an opposition to any kind of novel treatment whose results are unknown. "By Hercules, the woman would have just grounds for complaints if by means of a new and unknown method you had saved even both. To have attempted unbelievable things, even those that would be beneficial, never comes from a strong affection; and in a matter which is more uncertain, the rashness of an experiment shows only the boldness of despair" (chap. 11). It is not enough that a physician offered to save one of the brothers when others offer no hope. It would have been better to consult another physician who offered a more auspicious outcome than to employ a treatment that offers as much danger as utter hopelessness (chap. 14).

The prosecutor accuses the physician of offering a remedy for one of the brothers merely to furnish himself with the opportunity to examine the body of the other. The most dramatic part of the Declamation is the detailed description of the young man's vivisection. Although it is highly rhetorical and intended to produce an effect of pathos, it is unique in its attempt to describe what was regarded in antiquity as the most horrible kind of medical experimentation and it deserves to be quoted at length. "The coverings are removed from his quivering limbs and in order that the violent hands might gain entry to the whole body, the wretched and pitiably lean flesh is stripped bare. Then his entire frame is laid out on the full length of the bed to be exposed to an immovable and inflexible period of endurance. The torturer takes his knife, although he does not immediately make the entire incision with his hand but, because he penetrates gently and gradually, he keeps the boy's life suspended and poised in his suffering between life and death. This was the plea, this the exhortation of the young man who was about to die: 'Endure it bravely, allow it patiently; my brother will be cured. It is not through fear that you have taken my life; it is not that you are lacking in anguish. Beware lest you disturb the organs by crying or disturb them by panting or groaning, lest another's remedy perish.' The poor boy endured the poking around in every part of his breast,

53. *Supra*, n. 3.

which had been cut open, the result of that wicked deception of a fickle art. Do you think that the physician was satisfied in learning all about the man at first sight? Repeatedly the vital organs were taken out, studied, and taken apart. The hands accomplished more than the knife. Next to the doctor stands the father, gaping at the exposed vital organs as the physician disturbs with his bloody hands the seat of the soul oozing with gore, urging him not to hurry. He orders him to investigate deeply and carefully. He questions, hesitates, affirms and accepts the reason for his son's death.... The poor lad during this time was revived by draughts, he was occupied by words of encouragement. The remaining blood was stopped, and the exposed organs were closed up.... Now do you think that the physician investigated only the causes of this sickness? He investigated whatever he did not know and, having used this most extraordinary opportunity, he wished to advance to every novelty" (chaps. 19-21).

The Pseudo-Quintilian Declamation 8 is, of course, a work of fiction. To what extent does it describe contemporary views that were characteristic of Roman medicine. As we have seen, the writer of the work was evidently familiar with the tenets of both the Empiricist and Methodist sects. Medicine was regarded as part of a general education and we need not be surprised to find a rather detailed knowledge of certain aspects of medicine possessed by a lay person. Through the writings of the encyclopedists it became possible for laymen to acquire extensive knowledge of medicine. If the writer of the Declamation reproduces for his own purposes the doctrines of major medical sects, it is fair to assume that he also reflects their attitudes towards vivisection. In spite of the bombastic and polemical tone of the Declamation, given its nature as a practice piece for the law courts, we are probably justified in taking its arguments against medical experimentation as those which were used by both physicians and laymen against the practice, keeping in mind that the distinction in theoretical knowledge between physicians and laymen was less pronounced in the classical world than it is today. The Declamation may well reflect a contemporary revulsion in Roman society against examining the human body for scientific purposes. Celsus, while condemning vivisection, says that dissection of corpses is "a necessity for learners, who should know positions and relations, which the dead body exhibits better than does a living

and wounded man."[54] He does not say whether dissection was practised in his own day. But by the second century it appears that outside Alexandria dissection was a thing of the past. Rufus of Ephesus wrote that dissecting animals had replaced dissecting human corpses and Galen advised physicians to go to Alexandria where human dissections were still performed. He himself relied on dissection of animals and suggested that one can observe human skeletons only where they are preserved by chance. Edelstein attributed this seeming change in practice to the influence on science and medicine of magic and a traditional Roman interest in the protection of the dead. The Methodists and Empiricists had little interest in anatomy; thus even the demand amongst physicians for human dissection fell off, particularly in the West. Only in Alexandria, where there was a long-established tradition, was human dissection continued.[55] The fascination with vivisection that is apparent in certain Roman writers from Celsus to Augustine perhaps reflects a general aversion in Roman attitudes to any form of scientific examination of the human body. In this respect the Pseudo-Quintilian Declamation 8 may well be representative of Roman medical opinion, both lay and professional, and provides us with evidence of what may have been a popular hostility to any form of medical experimentation that ultimately made even the dissection of cadavers impossible.

Department of History
Oregon State University
Corvallis, OR 97331

54. *De Medicina*, Prooemium 74.

55. See Edelstein, "The History of Anatomy in Antiquity" (*supra*, n. 2), 250-51.

International Health: Challenges to the Basic Sciences*

JAMES E. BANTA

DURING the nineteenth century international health developed as an activity among nations in their attempt to cope with the spread of epidemic disease. Asiatic cholera, yellow fever, typhus, and bubonic plague gave impetus to the endeavor. Efforts centered around instituting international maritime quarantine procedures, and a series of sanitary conferences during the century endeavored to establish rules for quarantine and control of epidemic spread. The last quarter of the century brought the inception of scientific microbiology and immunology so that precise scientific control measures could be instituted. It was also the epoch of the establishment of scientific tropical medicine during which the etiology of the great tropical diseases, such as filariasis, malaria, and yellow fever, was established. This was the age of scientific microbiology and its establishment as one of the key basic sciences within the medical curriculum.

The growth of microbiology, entomology, and tropical medicine continued as the primary focus of international health over the first half of the twentieth century. It was only after World War II, the establishment of the World Health Organization, and the inauguration of President Harry S. Truman, that international activity in public health began to assume the dimensions by which it is recognized today. In his inaugural address in 1949 President Truman articulated a U.S. foreign policy which included technical assistance to the developing world. Technical assistance included activities within the health sector and firmly established health activities as an integral part of the process of socioeconomic development.

Throughout the nineteenth century physicians had played a major role in international health. Much of their activity was sponsored by churches and many physicians were sent abroad as medical missionaries. Similarly, the colonial powers, notably Great

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Britain, France, and Holland, in their far-flung empires, deployed medical officers who inevitably became involved in the control of epidemic disease and in the newly emerging discipline of tropical medicine.

In the mid-nineteenth century, Rudolph Virchow, founder of cellular pathology, came to recognize and to articulate that social and economic conditions have an important effect on health and disease and that these relationships must be subjected to scientific investigation. This came about because of Virchow's experience in studying an outbreak of typhus in Silesia in 1847. From his research Virchow concluded that the causes of the epidemic were as much social, economic, and political as they were biological and physical. This concept dominated Virchow's thinking. He stated that "medicine is a social science and politics nothing but medicine on a grand scale."[1] While he lived to see the blooming of microbiology during the last quarter of the nineteenth century and the influence of the discipline upon the concept of specific etiology of disease, for Virchow the tubercle bacillus was not identical with tuberculosis.

Virchow's concept of social medicine is an excellent working definition of what international health in today's world is all about, for the concept which he articulated impels us to approach the problem of disease and disease prevention from a *systems* point of view. Webster's definition of system is "a regularly interacting or interdependent group of items forming a unified whole" (*Webster's New Collegiate Dictionary,* p. 1184, col. 1 [Springfield, Mass.: G. & C. Merriam Co., 1976].). Scientific medicine regularly demonstrates its brilliant insight and technique in illuminating the systematic nature of human anatomy, physiology, biochemistry, and the other basic sciences. It appears to be notably less secure in relating the individual patient to the wider biological, social, and physical system of which he is a part. In his famous cartoons the late Mr. Rube Goldberg elegantly and humorously depicted the meaning of system, reminding us that strategic linkages within a system may cause the entire structure to collapse. In the practice of international health we must continuously remind ourselves of these linkages with the system and heed them well when planning and executing any health intervention scheme in the developing world.

The fundamental determinant of the health system is geography. Geography determines climate and natural habitat. It constrains and determines transport and communication. The geological envi-

ronment has a direct effect on nutrition and health. Trace elements and trace substances find their way into the air, the water, and the soil, thence into crops, animals, food supply, and ultimately diet. Thereby they either promote health or cause disease. To cite a few illustrative examples, consider environmental fluorine in relation to dental caries, iron in relation to anemia, and zinc in relation to normal growth and development. These are all well substantiated examples of the influence of trace minerals upon human health and disease. A classical example of a trace mineral influential in disease is environmental iodine. Environmental iodine is often deficient. This is a worldwide phenomenon and the deficiency may lead to endemic goiter or endemic cretinism. These diseases, known since antiquity, are still present in many mountainous parts of the world, including the Pyrenees, the Alps, the Himalayas, and the Andes.

The physical environment and the climate determine the biological environment. Soil, climate, and vegetation are the principal determinants of the agricultural economy of a region, which in turn is the basis of the food supply and usually determines the nutritional status of the inhabitants. The direct impact of sunshine as determined by altitude and cloud cover may affect the availability of certain vitamins, especially vitamin D. The presence of citrus and vitamin C in the diet, and the presence of green vegetables and B complex are closely related to the climate.[2]

Man also lives in, and participates in, a biological environment shared by other living creatures. Having a direct and immediate effect on human health is microbiological life, particularly that which is pathogenic and consists of live agents transmitted to man through soil, air, food, and water, or by live vectors. This aspect of the biological environment is of direct and immediate concern to health authorities especially since the mid-nineteenth century, when John Snow demonstrated that cholera was waterborne. His work was reinforced by the achievements of Pasteur, Koch, and the other pioneer microbiologists.

In summary then, we may present the practice of international health as the practice of epidemiology on a global scale, utilizing the model of prevention that is familiar to all who work in the control of infectious diseases. Epidemiology, in its original Greek, is defined as the study of *that which is upon the people* and requires delineation of the three parts of a triad. These are the agent, the environment, and the host — the elements of the system necessary for disease to occur in man. As indicated previously, geography is the primary factor

governing environment. But human existence, conditioned physically and biologically, occurs also in a social environment which includes many cultural, religious, and value-laden behavior patterns. Man as host contributes to the patterns of disease by virtue of his genetic pool, his individual physiologic resilience, and his ability to adapt. This model is useful when tactics for health intervention are developed. It is also of value in identifying tactics for further research and for examining the cost-effectiveness of control measures.

It is especially appropriate to apply this model to developing countries. But first consider, what is a developing country? We must remind ourselves that all countries are developing, and indeed that different regions of the same country are apt to develop at different rates. Developing countries are usually poor and are on the lowest rung of the socioeconomic ladder. These countries by and large lie between the Tropic of Cancer and the Tropic of Capricorn, endure a high prevalence of tropical diseases, and experience severe and widespread poverty. These nations can be characterized as suffering from "developing country syndrome." This syndrome includes low per capita income, low savings and investment, low industrial output, large agricultural labor force, poor roads, transport, and communication, a high birth rate with attendant population explosion, a high infectious-disease rate, high infant mortality rate, malnutrition, and illiteracy. Just as in clinical medicine a syndrome is defined as a disease state in which a group of signs and symptoms tend to run together, in a developing country the characteristics of underdevelopment tend to run together. They form a pattern or system demanding that the several elements of the syndrome be attacked simultaneously. A single, simple intervention is likely to prove ultimately fruitless.

Let us examine several developing countries to illustrate application of the epidemiologic model, as well as the constraints imposed by the "developing country syndrome." Human beings universally require shelter, food, and water. Shelter clearly reflects geographic constraints. Accessible materials must be utilized which keep out the sun or the monsoon and provide a degree of comfort in the presence of high temperature and humidity. Shelter also must be accessible to transportation, to food, and to water. But the very shelter which provides these benefits also provides an opportunity for insect vectors to carry disease. Especially important in this regard are the mosquito-borne viruses and malaria. The last-named is on the increase again in many parts of the tropical world and

presents a continuing challenge to medical scientists, to ministries of health, and to experts in economic development.

In 1979 the WHO Expert Committee on Malaria reported that "during the past ten years the malaria situation has progressively deteriorated in several countries. The resurgence of the disease (eventually reaching epidemic proportions) has particularly affected Turkey, several countries in Southern Asia, and some countries in Latin America." Malaria affects adversely not only the health of a population but also its potential for socioeconomic development. It aggravates malnutrition, since each attack burns up about 5000 calories, equivalent to almost three days of food for an adult.[3]

Individual dwellings collectively become a city. A characteristic of the developing world is the exploding metropolis resulting from the population explosion and the migration of rural people who seek jobs and opportunities in the city. The urban crisis is compounded by requirements for potable water, waste disposal, access to affordable healthful food, provision of elementary health care, educational facilities and personnel, and — perhaps most important — remunerative employment. Meanwhile, back on the farm, by agricultural methods which often have changed little in centuries, the farmer tries to eke out an existence by subsistence agriculture, hoping to produce an excess which he may sell in the market in order to buy essentials for sustenance of a family unit.

Among developing countries, one of the most pressing nutritional problems is the search for adequate protein at affordable prices. Chickens, swine, cattle and milk, the usual sources of animal protein familiar to developed countries, are not readily available because of inadequate food supplies for the animals, poor animal husbandry, animal diseases, or an otherwise inhospitable environment. Most of mankind must rely upon cereal grains as the basis of its food supply. The principal nutrients are the complex carbohydrates and vegetable proteins; scarce animal protein is available only to those who have adequate income. Fortunately, in many parts of the world, water, soil, and adequate manpower make possible the successful cultivation of grain, especially rice, and a viable agricultural economy. Grains occupy more than seventy percent of the world's crop area and provide fifty-two percent of man's food energy.[4,5]

While there are about thirty-two billion acres on the face of the globe, only about eight billion acres or about one-quarter are arable and of this approximately three-and-a-half billion acres, about forty-three percent, is currently under cultivation. Because of the con-

straints of water, fertilizer, and sometimes of endemic disease[4,5], the amount of cultivable land is not infinitely expandable. River blindness or onchocerciasis (caused by a filarial worm), for example, prevents the cultivation of many fertile alluvial river basins in Africa.

I often point out to students at Tulane that the most important health establishment within the city of New Orleans or any U.S. city is the local food market or supermarket, which makes available, accessible, and (it is hoped) affordable, a healthful diet. The American supermarket is the culmination of the very complex system of agriculture, food science, and marketing, the elements of which are totally lacking in the vast majority of cities in the developing world. Nevertheless, local market mechanisms do exist throughout the developing world and provide for the local diet an array of foods which is not always affordable, abundant, or varied, and is subject to great seasonal variation. The complex food chain presents many opportunities for basic scientific research in subjects ranging from genetics to pathology. Indeed the award of the Nobel Prize to Norman Borlaug in 1970 highlights the importance of research to insure an adequate food supply, particularly of cereal grain, in contributing to human health and to world peace.

The specter of Malthus haunts every international health worker, since the exploding world population remains the principal obstacle to successful socioeconomic development and to a better life for all of us, especially for those in the developing world. The population of the world is now between three and four billion and continues to increase at about two percent annually. There are optimistic demographers and pessimistic demographers, but most agree that the population of the world will be somewhere between six and seven billion by the year 2000.[6] These people require food, shelter, jobs, and health services. If the population grows at the rate of one percent annually, it will double in about seventy years. If it is growing at about two percent annually it will double in about thirty-five years. In some parts of the world the increase approaches three percent. Robert McNamara, former president of the World Bank, stated that "except for thermonuclear war, population growth is the gravest issue the world faces."[7]

A case in point is El Salvador, a country that has been much in the news in recent days. We have heard much about the politics of El Salvador, right, left, and center, but we have heard little about the demographic factors that are driving that country to its destruction. In 1850 the population of El Salvador was estimated at four hundred

thousand. In 1900 it was eight hundred thousand. In 1968 it was three point three million. By 1987 at the present rate it will reach about six point six million.[8] What does this mean in terms of housing, energy resources, schools, potable water, or medical facilities?

El Salvador is a tragic case in point. Look elsewhere in Latin America. Look at India, look at Bangladesh, look at Pakistan, look at Egypt. It is totally and utterly irresponsible to speak of international health programs designed to improve health and the quality of life without considering vigorous, dedicated, and effective programs for the control of population. Other aspects of health, whether improved nutrition, infectious disease control, or effective primary health care services, will mean nothing without effective population control. Therefore, every international health program must include population control and family planning services as an integral part of its program.

Unfortunately, we do not have all the tools we need to carry out the required programs. At present we do not know how to attain our goal. We have tools but we desperately need more effective tools that are cheap, easily applied, and acceptable to the many men and women who must use them. In this field the basic scientist still has plenty to do. The challenges are not wanting, whether to biochemist, endocrinologist, or demographer, and perhaps most of all, to the behavioral and social scientist.

During the past decade there has been much argument as to whether contraceptive and family planning services should be integrated with primary health care services or maternal and child health care services, or should be independent of other health services. There are data to support both points of view but there should be no difference of opinion as to the high priority which such efforts should be given and as to the usefulness of an eclectic approach. The human population growth rate will be reduced by war, famine, plague, or contraception. The question is not whether but how.

As stated above, the unique environment of man is the sociocultural environment which he shares with his fellow man. One of the better concepts of culture was that offered by Foster, who said: "Culture can be thought of as the common, learned way of life of the members of a society, consisting of the totality of tools, techniques, social institutions, beliefs, motivations, and systems of value known to the group."[9] This cultural and value system profoundly affects

human behavior. Closer to our purposes, it affects health behavior. The most recalcitrant problem faced by any international health worker, indeed, is the ability to cope successfully with this dimension of man's existence.

Culture finds an important expression in various religious manifestations. As articulated in the world's great religions it is shared by large ethnic groups of mankind. If we are to appreciate human behavior we must study and understand the principal tenets of the great religions: Buddhism, Islam, Hinduism, Christianity, or mixtures, such as the syncretic religion of Nepal created out of elements of both Hinduism and Buddhism. Any health worker who does not understand the world view, the value system, the taboos, the dietary laws or the moral imperative of family customs, and attempts to establish a health program dependent upon some modification of human behavior is doomed to failure. The sociologist, anthropologist, and psychologist have especially important roles to play. Their role has been neglected not only in the practice of international health, but also in the education and practice of the health professions in our own society. Since it is generally recognized that nearly three-fourths of the disease problems in our own society, among them heart disease, pulmonary disease, and neoplasia, are either exacerbated or induced by personal health behavior, more emphasis should be given to the behavioral sciences among the more important basic sciences in the medical school curriculum.

Control of the infectious diseases represents one sector of international health shared by all countries, whether highly developed, developing, or underdeveloped. Great pandemics transcend boundaries. The classical epidemiological model discussed earlier was derived from communicable disease control and it has proved to be a very successful model in this regard. Communicable disease control lends itself well to consideration of physical and biological environment, which are often much more easily manipulated than the sociocultural environment. Communicable disease can often be controlled without fundamental changes in human health behavior. The best example of this, and one which serves as a paradigm for the control of communicable disease, has been the worldwide eradication of smallpox. Let us examine some of the elements which have made this endeavor possible. It was possible because of the biological characteristics of the causative organism. The virus is of relatively low infectivity, it produces no asymptomatic carriers, and it produces a disease which is rather easily recognized. In addition, it does not

depend upon a vector or intermediate host. There is a vaccine which is virtually one hundred percent effective, is cheap, and produces long-lasting immunity by a single inoculation. Few communicable diseases meet these criteria.

Smallpox was eradicated moreover because of effective public health practice. The worldwide eradication program under the aegis of the World Health Organization was an elegant example of international cooperation. There was effective health leadership, there was public involvement, and the campaign lent itself well to operation by objective. There were also almost two centuries of research and development beginning with Jenner in the eighteenth century. During the campaign there was excellent laboratory support, attention to careful field research and evaluation, and a cadre of trained, dedicated professionals.

Unfortunately, other major international diseases do not conform to this model. Consider most of the so-called tropical diseases, such as malaria, schistosomiasis, or filariasis. All of them have complex, biological cycles, involve intermediate hosts or vectors for their dissemination into the human host, and their diagnosis usually depends upon relatively sophisticated laboratory techniques. There are diseases for which we do not have effective immunological means of control and whose control, to say nothing of eradication, depends upon the ability to limit the adaptive capacity of biological systems, for example, to prevent mosquitoes from becoming resistant to insecticides. Much basic research in microbiology, immunology, and entomology must be done before we can design effective measures of the same order of magnitude as those which were marshalled in the eradication of smallpox.

In 1978 the World Health Organization held a conference at Alma Ata and set as a goal the attainment by all peoples of the world by the year 2000 a level of health that will permit them to lead a socially and economically productive life.[6] This is to be attained by means of primary health care. Because of the costs and numbers of trained personnel required, it is completely unrealistic to expect that this goal can be achieved within the foreseeable future.

If we are not to give up in despair, we must seek constructive alternatives to the establishment of primary health care systems in most developing countries. The infectious diseases are usually the principal burden and it has been estimated that three to four billion persons in the developing world suffer from these afflictions. The burden of parasitic disease alone is enormous. The morbidity

inflicted by these diseases inhibits agricultural and industrial development. Since fifty percent of children may die within five years of birth, it is difficult to encourage family planning and institute successful population control programs. During the last decade the U.S. Agency for International Development has encouraged the development of an integrated health delivery system, with emphasis on maternal and child health services, nutrition, and family planning. This goal is not inconsistent with that proposed at Alma Ata.[10] However, since the estimated annual cost ranges between forty cents and seven and a half dollars per capita per annum, it is unlikely to be realized. Since infant mortality is the greatest contributor to national mortality, and this results particularly from infectious diseases, it is reasonable to examine alternatives to the primary health care delivery system as a method of intervention.

Walsh and Warren examined this problem and developed an interim strategy for disease control in developing countries based upon selective primary health care.[11] Their first step was to establish priorities. They based their selection on prevalence, morbidity, mortality, and, very important, on the feasibility and cost effectiveness of control measures. Diarrheal disease is by far the greatest contributor to morbidity and infant mortality. The etiology is often nonspecific and the disease may be self-limiting, but in a poorly nourished child dehydration and electrolyte imbalance take a high toll. Early rehydration and electrolyte replacement by the mother in the home can go far to mitigate the appalling mortality. Therefore, diarrheal disease has been given the highest priority, together with measles, malaria, whooping cough, schistosomiasis, and neonatal tetanus. Walsh and Warren assigned these diseases a high priority because of their high prevalence, their high mortality or morbidity, and because cost effective control is available which may be applied without comprehensive primary health care delivery systems.

Other diseases might seem to deserve high priority but on careful consideration must be rejected. An example is tuberculosis, with its high prevalence and high mortality; unfortunately, control is difficult, prolonged, and relatively expensive. Malnutrition, an associated etiologic factor, contributes not only to morbidity and mortality from infectious disease, but impedes normal development, including mental development. Nevertheless, despite the high prevalence, morbidity and even mortality of malnutrition, control is extremely complex and certainly not controllable by health intervention alone.

The strategy of Walsh and Warren is rational but cannot be

universalized. Each country, indeed each region, must be appraised, and priorities must be set within the context of the local problems, the resources, and the felt needs of the health officials and people of the region concerned. For example, in the Volta River Basin onchocerciasis afflicts about thirty million people. At present the problem can be controlled only by attacking the vector fly with larvicides. It costs ninety cents per capita per year to carry out the project of control and it must be continued for twenty years. However, this cost can only be judged in relation to the increased amount of high-quality agricultural land made available as a result of the control measures. The alleviation of blindness and the prevention of disability must be considered also. We need more effective measures for dealing with virtually all these problems. We must have data and techniques which will improve our ability to develop cost effective programs if disease prevention. Unfortunately, research funding for the major diseases in the developing world in recent years has not been a source of great national pride. In spite of the fact that malaria is increasing as a major problem of world health, only two cents per infected person per year was spent in 1978 on malaria research. A similarly dismal tale can be told about the other major tropical diseases. Imagine the effect in reducing death and disability if we had a cheap effective vaccine against malaria or diarrhea-producing viruses or *Escherichia coli*. Until effective means of control are available, the best strategy for many disease problems in the developing world is to concentrate on research, utilizing the scarce resources available to find effective answers instead of expending them on ineffective programs economically unfeasible and doomed to failure.[11]

To summarize, the goal of the *systems approach* to international health recognizes international health as coordinate with socio-economic development. Health is one human activity, while clearly political within the context of Virchow's definition, that can often transcend ideology. On the other hand, it is often unable to transcend ideology. Note that health is fully exploited by the Soviet Union, Cuba, and their allies as a relatively cheap tool for buying friendship and a diplomatic climate favorable to communism. In the developing world there are many health programs staffed by Cuban, Russian, and Eastern bloc health personnel. Health is an international diplomatic weapon which they fully exploit. Meanwhile, the new A.I.D. (Agency for International Development) budget proposed by President Reagan was $1.9 billion. In 1977 it was $3.4

billion. The U.S. contributes one-twentieth of one percent of its gross national product, while Sweden contributes about one percent. The U.S. will be sixteenth among countries providing foreign assistance.[7]

The roots of international health are in the basic sciences and the scientific tradition, which relies on an objective and unbiased data base and seeks rational and non-ideological solutions to problems. It recognizes that there are no easy solutions, and that solutions must take into consideration the system of which health is both a goal and a process.

In seeking to address the health problems of the developing world from the perspective of the epidemiologic model and the systems approach, one cannot avoid observing a great degree of applicability to the health problems of our *own* society.

School of Public Health
and Tropical Medicine
Tulane University
New Orleans, LA 70118

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ESSAY-REVIEW

BOK, DEREK. *Beyond the Ivory Tower: Social Responsibilities of the Modern University.* (Cambridge: Harvard University Press, 1982). 336 pages. Price $15.95.

Reviewed by LEWIS W. BLUEMLE, JR.

DEREK Bok is well qualified to explore the central question of his book: to what degree and on what principles should universities serve as instruments for solving social problems, either through academic means, e.g., preferential admission policies for minority students, or non-academic means, e.g., boycotts against companies dealing with apartheid South Africa.

He begins with a cogent review of how our contemporary set of basic academic values came about. The university of a hundred years ago, a quiet enclave emphasizing mental discipline and religious piety, is traced through its early twentieth century domination by conservative administrators backed by wealthy trustees to the advent of academic freedom giving faculty virtual autonomy in all matters of educational policy. The stage is then set for the dilemma of social responsibility when World War II transposes the ivory tower to a critical national resource for solving technologic and manpower problems, both defined and funded by governments.

The first question addressed is, to what extent should the university, now the "multiversity," sacrifice its core missions to meet the mounting demands of the state replete with the inconsistencies and red tape of a formidable bureaucracy. Using pertinent examples of the adversarial conflict, Bok draws the line by agreeing with Justice Felix Frankfurter that: "For society's good, political power must abstain from intrusion into this activity of freedom, except for reasons that are exigent and obviously compelling." He clearly delineates unacceptable strategies (government commands) from acceptable cooperative procedures, subsidies, and market forces, urging throughout that government agencies formulate their plans in consort with universities before implementing them.

Having set the ground rules for this interaction he then introduces the other players in the conflict, principally students and faculty of opposing political persuasions who seek by fair means or foul to use the university for the social ends they espouse. These range from a

new kind of suppression of academic freedom from the left (limiting academic appointments and research) to the acquisition of local property for university expansion.

As the arbiter of these and other significant campus disputes, Bok carefully dissects the validity and weaknesses of positions taken by all parties at interest. He also explores their motives and differentiates them from the broader accountability of the university president, who must keep the total institution alive and moving in the right direction.

I found the section entitled "Academic Science and Technological Innovation" to be a wise defense of academic freedom in research at a time when pragmatic forces from both government and industry threaten to intrude too far. Conversely, Bok's analysis of affirmative action policies added few new insights except for a differentiation of student admissions issues from those involving faculty appointments.

Fundamentally Bok seeks guiding principles which may be useful to others in keeping the modern university on an even keel in stormy times. He does this largely in a fluent, Socratic style, not dissimilar from the treatment of *Lying* by his wife, Sissela Bok (Pantheon Books, 1978). In the main he is successful. At times, however, perhaps for brevity's sake, conflicting philosophical positions are presented in loosely documented, stereotypic form, seeming to create straw men easily knocked down. This criticism, however, would only be just if it came from another who had heard the strident voices that Bok heard during the modern university's most turbulent years.

Beyond the Ivory Tower is a scholarly reference of practical value for any administrator, trustee, faculty member, student, alumnus, or government official seeking a solid historical footing before taking a stance on any campus issue of social significance.

Office of the President
Thomas Jefferson University
11th & Walnut Streets
Philadelphia, PA 19107

ESSAY-REVIEW

HARVEY, WILLIAM. *Disputations Touching the Generation of Animals.* Translation with Introduction and Notes by Gweneth Whitteridge. (Oxford: Blackwell Scientific Publications, 1981). lxvi & 502 pp., illustrated. Price £25.00.

Reviewed by JANE M. OPPENHEIMER

WHEN, about thirty years ago, I wished to read William Harvey on generation, I simply came to the Library of the College of Physicians of Philadelphia, and read there, in English, *Anatomical Exercitations Concerning the Generation of Living Creatures*; this translation was published anonymously in 1653, two years after the appearance of the original Latin. I felt, as I read it, that even had it not carried a date, I would have suspected, from its sonorous periods, that it had been prepared by Sir Thomas Browne. (Browne in fact had read it; he wrote of it to his son Edward, "it is an excellent peece and full of observations.") If and when Harvey's statements seemed enigmatic to me, I went to my own bookshelves and studied them in the translation prepared in the 19th century by Robert Willis for the Sydenham Society. Therein they sounded dry as dust. No one reading that version would have mistaken the translator's prose for that of T. H. Huxley, or even that of Thackeray or Trollope. But the two translations were then at hand, the only two in existence up to the time of the translation now provided by Gweneth Whitteridge; they are now hard to come by in the marketplace. Thus this new translation makes again available an interesting and important work. But it also has virtues over and above its mere availability.

Harvey's original contributions to embryology were various. He corrected a number of specific errors that Aristotle had made regarding the development of the chick. But more important, he demonstrated that the *cicatricula* (what we call the blastodisc), not the chalazae, the thick spirals of albumen we see when we open an egg into a dish, is the source of the embryo. He also expressed vividly an epigenetic view of development, although admitting that other modes characterize the development of some creatures. "Some animals," goes the translation, "are formed out of material that is already concocted and grown, and are transfigured, and all their separate parts arise at the same time by a metamorphosis, and a

perfect animal is born. Some have their parts made one after another, and then, out of the same material they are at the same time nourished, increased and formed, that is to say some of their parts are formed before the others which are formed later, and at the same time they are both increased and formed. Now the construction of these begins from some one part as from its original, and by its help the other members are produced, and these we say are made by epigenesis, that is gradually, part after part. And this, rather than the former, is properly called generation."

Harvey's book treats not only of these, but also of many other things. Roughly 325 pages (61 chapters) of the present version are devoted to chickens and eggs; Harvey even mentions Plutarch as having enquired "which of these two came first the egg or the hen?" If you wish to know Harvey's answer, he begs the question in a typically eloquent but equivocal passage: "The hen indeed is first in the order of Nature, but the egg in the order of time.... We may say, that egg is older than this hen, . . .and contrawise that hen existed in time before this egg which she laid. This circuit makes the race of chickens to endure for ever, while now the chicken and now the egg in a perpetually continuing series produce an immortal race from individuals that are transitory and fade away." The detailed disquisition on the chick takes up, among other things, the fowl's reproductive apparatus, the formation and constitution of the hen's egg and even its taste under various conditions, many aspects of embryonic chick development, and Harvey discusses the supposed relative roles of cock and hen in reproduction.

Chapter 62, to which we shall return shortly, describes its content in its title, "that an egg is the common original of all animals;" the ten remaining chapters deal with viviparity and with what Harvey thought he understood of the development of mammals. The main text concludes with three brief separate essays: "Of Parturition," "Of the Membranes and Humours of the Uterus," and "Of Conception." The book ends with a brief Appendix that presents in Latin and in English Harvey's annotations to his own copy (now residing in Newcastle) of the *De Generatione.*

The apparatus provided by the translator includes brief notes at the end of each chapter; these mainly identify in modern versions the locations of the many passages of Aristotle and Fabricius referred to by Harvey, and of those of other authors whom he cites less frequently. There is also a brief author's preface, and a splendid

introduction about forty-five pages long. The quality of the translation is superb. Whitteridge says that she has "followed the first English version, for its simplicity and directness are much to be preferred to Willis's verbose style." Indeed, her own style has retained much of the delightful flavor of the 1653 translation but has made the text more easily intelligible to readers unfamiliar with the nuances of 17th century thought and language.

The introduction points up the significance of Harvey's principal contributions and evaluates many of his ideas, some of which are obscure. Embryologists and historians alike have much to learn from it. One of her interpretations worries me, however; I think she put too much credence in his belief that all living creatures grow from an egg. She fails to point out that he did not understand — how could he? — that mammals develop from the sort of egg that von Baer discovered about 165 years later. Harvey's egg was a metaphysical one, not something produced by a being to be discovered later as cellular. In the chapter entitled "What an Egg is," the text is as follows: "Now an egg is a certain conception proceeding from the male and from the female, endowed equally with the virtue of both, out of which, being one, one animal is made.

"Nor is it only the beginning but the fruit also and the end; that is to say it is the beginning of the offspring that is to be generated, but it is the fruit of both parents, for example the work of the cock and of the hen, or the end which they proposed to themselves in generation, and it is the origin of the future foetus. . . . It is also a medium between something animate and something inanimate, for it is neither absolutely endowed with life nor absolutely deprived of it. It is a middle way or passage between parents and children, between those that were and those which are to come; it is the centre and very hinge about which turns the generation of the whole race."

I am also concerned at Whitteridge's apparent conclusion that "*De generatione* is not entirely lacking in form and structure and it does show certain similarities with *De motu cordis*." *De Motu* is terse and lucid. While the list of chapter headings of *De Generatione* can be organized into an outline, the content of the book is not tightly systematic. Harvey's style in it is garrulous, disorganized, and repetitious. It is inconsistent in places, and abounds with digressions. Some of these are fascinating, to be sure. For instance a long discussion of the differences between the eggs of one hen and those of another contains a passage about how "a simple, ignorant

shepherd who had the care of a great flock of sheep. . . grew so well acquainted with each one of them that if any one were missing from the flock, although he did not know how to count, yet he could straightway tell which one it was, from whom it was bought or whence it came. Once, for a trial, he singled out from among forty lambs penned together in the same fold the one his master chose and carried it to its mother as she was grazing with the flock." A few pages later he asks: "Who can forbear to wonder at the affection, or rather frenzy, of the broody hen, the which nothing can extinguish but a deluge of cold water? So long as this rage is upon her, she neglects all else, and like a mad thing walks about with her wings trailed, her feathers ruffled and unkempt, restless and querulous. . . . Who can refrain from smiling to see a hen, who has hatched a brood of supposititious ducklings thinking them to be her own, following them when they are swimming in the pond and running round and round it, trying to wade in to her own danger and calling to them, and with wondrous cunning arts essaying to entice them back to her?"

The directness and tense concentration of *De Motu* allows for no such subjectivity, and this treatise is of a wholly different construction. But the looser writing of *De Generatione* adds to its great charm, which over and above its historical and scientific importance enhances the value of the book for late 20th century readers. Historians, embryologists, and obstetricians will all, like Sir Thomas Browne before them, find it "an excellent peece, and full of observations."

K-1 Mayflower Apartments
922 Montgomery Avenue
Bryn Mawr, PA 19010

ESSAY-REVIEW

LANSING, DOROTHY I., M.D., ed. *Medicine and Science in Early America, being the collected essays of George Edmund Gifford, Jr. 1930-1981.* (Devon, PA: ANRO, 1982). 388 pages, illustrated. Price $24.95 plus $1.00 for postage and handling, available from the Committee to Memorialize George E. Gifford, Jr., P.O. Box 537, Paoli, PA 19301.

Reviewed by FRED B. ROGERS

DR. Dorothy I. Lansing and her colleagues have done good service in bringing together in one volume these scholarly, readable articles by our late friend Dr. George E. Gifford, Jr. A charming man of many talents, Dr. Gifford chronicled a rich heritage of Americana during a too-short lifetime. This attractively printed collection of his published writings is a tribute of affection and esteem, and represents the prolific and varied literary output of an erudite psychiatrist, Naval Reserve Captain, and lover of mankind. The outline chronology of his career which follows Dr. Lansing's fine foreword impresses one with the great productivity of Dr. Gifford's professional life in medical practice, teaching, and research. His wife, Laura, helpmate and teacher, receives due credit for her contributions in this volume of essays, which is dedicated to her. It is an impressive memorial.

Twenty-four of the collected articles first appeared in the *Harvard Medical Alumni Bulletin* during the years 1961 to 1978. They range from "Shattuck's Bunting" and "Parkman's Wren," evidencing New England fondness for bird watching, to "Medicine at Harvard: The First 300 Years" and "Elijah and Ezekiel on Mt. Mica" at Paris Hill, Maine. Twenty-seven historical articles published during 1956-1982 are culled from other journals. Many pertain to biography and history in Maryland, Gifford's home state and the site of his academic roots. By topic they range from "Melville in Baltimore" to "Audubon's View of Baltimore, Written with Florence B. Smallwood." For the modern era Dr. Gifford discusses "A Psychiatrist Analyzes the Relationship Among Doctors, Pharmacists, and Patients."

At the time of his death George Gifford was Head, Section on the History of Medicine, and Associate Professor of Socio-Medical Sciences at Boston University School of Medicine. In this capacity

and as Consultant to the Historical Collections in the Francis A. Countway Library of Medicine he made full use of his talents; he produced the noteworthy film series "Leaders in American Medicine" and spoke and wrote about the history of medicine and of such allied sciences as botany, ichthyology, mineralogy, and ornithology. He was in continual demand as a lecturer in various parts of the country. He spoke at the College of Physicians of Philadelphia on "Medicine and Natural History — Crosscurrents in Philadelphia in the Nineteenth Century" (published in *Transactions & Studies*, January 1978), and was interviewed by Mrs. Marion R. Vuilleumier for the Cape Cod Writers' Conference television series "Books and the World" in 1980.

Patriotism and medical history fused when Dr. Gifford served as guest editor for the Bicentennial issue, March/April 1975, of the *Harvard Medical Alumni Bulletin* and for the issue of March/April 1976, in which papers by several contributors highlighted the five physician-signers of the Declaration of Independence. These were published in book form in New York the same year. His articles, "Medical History: Curio or Cure" (1975) and "The Physician Signers" (1976) are included in this volume. In *Dear Jeffie...* (Cambridge, MA, 1978) he edited the letters which Jeffries Wyman, the Harvard anatomist and first director of the Peabody Museum, wrote in the 1860s to his son Jeffries Wyman, Jr. Three installments of these letters are reprinted in the present collection.

Active for many years in the American Association for the History of Medicine, George was chairman of local arrangements for its 1980 meeting and conducted the members on a tour of Boston's medical monuments. His report, "A Medical Tour of Boston," which appeared in the *Journal of the American Medical Association* (May 15, 1982), is the last entry to this posthumous edition of his writings.

A patron of learning and libraries, Gifford served as secretary of the Board of Trustees of the Boston Medical Library from 1973 to 1979 and continued his loyal concern thereafter. His works embraced general scholarship; he collected books and manuscripts and was a member of the American Antiquarian Society, the American Osler Society, the Club of Odd Volumes, and the Grolier Club. As Dr. Dorothy M. Schullian has noted, he achieved "a luminous record of selfless but happy and buoyant devotion in all he undertook."

Writing being largely autobiographical, George Gifford personified the gentlemanly physician-naturalist of the genre he recalled

from early American medicine and science. His pen revealed diverse interests, humanly varied and served up by a master of wisdom and wit. This volume of his essays is the chronicle of a fine lode of literary ore, and it provides a rich legacy to George Gifford's nation, profession, family, and friends.

Department of Family Practice
and Community Health
School of Medicine
Temple University
Philadelphia, PA 19140

ESSAY-REVIEW

ECCLES, AUDREY. *Obstetrics and Gynaecology in Tudor and Stuart England.* Kent, Ohio: The Kent State University Press, 1982. 145 pp., illus. Price $18.00.

Reviewed by GORDON W. JONES

AMONG all the specialities of medicine, general obstetrics was for long almost unique in its emphasis on caring for a normal human process — reproduction. Except for preventive medicine, all the other specialities have tended to treat only the abnormal. Obstetricians have cared for the normal for centuries; only lately have subspecialities of obstetrics devloped which are devoted entirely to the abnormal. Everyone admits that 80% or so of parturient women go through an essentially normal pregnancy and labor. They are an abiding joy to those who care for them. The stress comes in managing the 20% who do poorly or even catastrophically. One of the problems, of course, is the estimate of which pregnant women will fall into the 80%, which into the 20%. And who is to watch over these women: midwives or trained physicians? Some have long maintained that midwives could or should care for the normal and call in physicians for the abnormal. The problems here are the prediction of the abnormal and the rather human reaction on the part of obstetricians who maintain that they deserve the chance to balance out the stressful cases with the happy joyous ones.

Lately there has been a spate of books, well written, which have had a more or less strong bias against obstetricians and in favor of midwives.[1] Many popular publications, furthermore, have seemingly tended to brainwash women into believing that childbirth is as normal a process as going to the toilet and therefore can be handled either cheaply by a midwife (incidentally, some charge as much as many obstetricians) or quietly at home without help. Recently a woman in Virginia who tried the self-help approach died of hemorrhage due to a simple retained placenta.

1. See Richard W. Wertz and Dorothy C. Wertz, *Lying-in: A History of Childbirth in America* (New York: Free Press, 1977), and Judy Barrett Litoff, *American Midwives 1860 to the Present* (Westport, Connecticut: Greenwood, 1978).

For ages midwives have taken the responsibility of maternity cases, in primitive times, in ancient times, in the middle ages, and up to the very present. Obstetrics as a medical specialty practiced by males (recently by females also) did not really arise until approximately the era discussed in the book under review. True, Soranus wrote a gynecological text in the second century A.D. in which he discussed obstetrical problems to some extent.[2] Trotula, an eleventh-century female physician of Salerno, wrote a tract on the handling of maternity cases. But usually physicians left obstetrics to the midwives and were satisfied with being called in dire emergencies.

The shift from midwife care to physician (or "barber-surgeon") care of maternity cases and the development of obstetrics as a medical specialty came coincidentally (and surely causally) with the time when modern medicine in general had its somewhat feeble beginnings. Physicians learned about anatomy and physiology. Medical schools developed. Doctors wrote an ever-increasing stream of books. Some of these, it is true, contained nonsense, but most held at least a kernel of truth. Physicians began to question age-old obstetrical traditions and folklore. They learned to use the evidence of their senses and they created an attitude of doubt. When anatomists showed that the uterus is fixed by rigid ligaments, the belief that hysteria was caused by migration of the uterus about the body was given up (p. 77). The notion that the bones separated in labor had to be abandoned and the passivity of the fetus in the birth process was established (p. 56). There were many other little advances which finally reached a respectable aggregate. The midwives were for the most part too ignorant to write, and from one another they learned traditional methods, which often were brutal. This is the worst view of the midwives. Many were conscientious; some male practitioners were not (p. 87).

In this short book Audrey Eccles examines carefully — and sometimes too concisely — most of the aspects of this Tudor-Stuart period, roughly 1550–1740, where the roots of modern obstetrics lie. First she surveys the English obstetrical literature before 1740. It is evident that the most important influences on the English were the great books by Paré and Mauriceau of France. Purely English works were of less worth until the late seventeenth and eighteenth

2. Soranus Ephesius, *Gynecology*, trans. Owsei Temkin (Baltimore: Johns Hopkins, 1956), pp. 191 ff.

centuries. Eccles emphasizes (p. 14) the ignorance portrayed by Mrs. Jane Sharp, the first literate English midwife, in her book for midwives. It was not until the Chamberlen invention of forceps and the publication of substantial books like those of Chamberlen and Giffard that male-midwifery really got its start in England.[3]

In Chapter Two the author shows how physicians had to overcome their reverence for ancient doctrines. Even well into the nineteenth century physicians practiced the humoral treatment of blood-letting. It took a long time for Harvey's discovery of circulation to be recognized as important. It took years to get rid of the idea that the uterus is divided into seven cells, even though Bartholin had expressly denied it (English translation in 1668). And even Mauriceau refused to believe the validity of the ovum theory. Controversy raged for many years over sexuality and conception. Harvey's idea of the ovum, DeGraaf's description of the follicle, Van Leeuwenhoek's discovery of the sperm — all had little immediate influence. But more and more men were observing and thinking. The fundamental discoveries of physicians and scientists eventually widened the gulf between ignorant midwives and physicians who liked obstetrics.

Chapter Six describes in detail the slow development of knowledge about the fetus. Age-old ideas were only slowly given up. Paré and Mauriceau seemed to have abundant native common sense. However, one A. Read was perhaps the first to realize and emphasize the fact that the longer the fetus stays in utero up to nine months the better. That a seven-month fetus is more likely to survive than an eight-month one was recognized as foolishness. Yet even Paré seemed to accept this unlikely bit of folklore. At a time when modern anti-abortionists are defending the embryo as a person it is amusing to find that the time of "ensoulment" was of concern in 1641, when Vicary insisted that ensoulment occurs at 43 days, a time some anti-abortionists have chosen today. We can deride ideas of maternal impression today at will; Mauriceau was a pioneer in this opinion. The puzzle of menstruation and its purpose and the actual identification of menstrual blood with breast milk are discussed.

3. François Mauriceau, *The Diseases of Women with Child and in Childbed*, trans. Hugh Chamberlen, 5th ed. (London: Cox, 1716); John Maubray, *The Female Physician containing the Diseases incident to that sex* (London: Holland, 1724); William Giffard, *Cases in Midwifery*, revised and published by Edward Hody (London: Motte, 1734).

And where did the fetus get its air? Read alone denied the usefulness of holding open the mouth and genitals of a dead mother.

Mauriceau, and Chamberlen after him, were certain that in labor it was the expulsive power of the uterus which delivered the baby, and not the child's own muscular activity. Mauriceau was certain that the pelvis of the female is larger than that of the male. The bones do not open up. And Mauriceau also had a correct understanding of the significance of lochia.

The chapter on the diagnosis of pregnancy presents a long list of superstitions.

Chapter Eight discusses the prevention and promotion of pregnancy. Abortifacients were tried. Abortions were performed. Strangely, none of the writers mentioned by the author discussed contraceptive sponges and condoms. The former were in use even in ancient times. Allegedly the condom was invented by a "Colonel Condom" for King Charles II, perhaps about 1660.[4] It would seem that Charles was running out of dukedoms for his bastards.

Only one chapter is devoted to gynecology. Galen, Soranus, and other ancients had been interested in this subject. On exhibition at the museum in Naples are vaginal specula that were obviously useful. Ancient gynecologists apparently were consulted frequently. Just how much gynecology was done, not just written about, in the period covered by this book is not clear. Most treatments and most opinions on menstruation, dysmenorrhea, and hysteria, were folkloristic. The author does not emphasize the astonishing amount of popular and professional literature devoted to venereal disease in the Tudor-Stuart period. It must have been rife. Where we today recognize perhaps ten different diseases, our predecessors lumped them all together as manifestations of one malady.

After devoting a chapter to normal childbirth the author delves into the terrible problem of complicated obstetrics in the Tudor-Stuart age. The men-midwives justifiably criticized midwives for meddlesomeness: tugging at the genitals, scratching open the membranes with fingernails, excessive abdominal pressure, using kitchen knives, ladles, or threaded pack needles. Stitching of lacerations was sometimes recommended by the doctors. Hemorrhage and eclampsia

4. Bernard Ephram Finch and Hugh Green. *Contraception through the ages* (London: Peter Owen, 1963), p. 49.

often presented insoluble problems; both were actually treated by bleeding. Chapman alone opposed bleeding in the presence of hemorrhage. Bloodletting was traditional for centuries past and for generations to come.

Today we can read Chapter Twelve on operative delivery with horror at what probably 5 to 10% of women had to undergo. Midwives used desperate measures. Physicians delivered more expertly by destruction or with "crotchets." These hooks had been mentioned a millenium and a half previously by Soranus and by Celsus.[5] Often surgeons, fearing damage to their own reputations, refused to attempt delivery in cases that had been botched by midwives. Mauriceau's own sister died thus. Caesarean sections were attempted in the sixteenth century with total mortality; the first done successfully by a surgeon in England was in 1793 (p. 115). To avoid the horrors of the hook and section, barber surgeons developed the technique of podalic version, described by Paré in 1549. This was a great advance, if we consider the alternatives, and the method was used with success even in this century by experts like Potter. Lesser men now shun it.

The next great advance was the invention of the obstetric forceps in the seventeenth century by one of the Chamberlens, who kept it a family secret for a long time. It has long been a mystery to me why no one else invented the forceps in all whose hundreds of years when spoons, ladles, and hooks were used frequently.

The author believes that the maternal mortality in the sixteenth century and seventeenth century was about 25 per thousand pregnancies, perhaps five times the mortality in the nineteenth century. With modern obstetrics it is far lower than this. Also, prolapse is now rare and delivery-caused vesico-vaginal and recto-vaginal fistulas, abominable disorders, are now almost unknown.

The author is to be congratulated on giving us a dispassionate and strictly factual view of what we may call the basic period of obstetrics. By implication it refutes the opinion of some recent authors that the takeover of obstetrics from midwives was due to mere greed on the part of male physicians. It was the men of this period who discovered the facts of anatomy and physiology and thus slowly put to rest ignorant folkloristic notions which had led to dangerous or useless procedures. Men even dreamed up the germ

5. Temkin, *op. cit.*, and Celsus, *De re medicina*, Liber V, Cap. XXI.

theory of disease in this period (Fracastorius, Needham, Morton, our own Cotton Mather) and proved it in the late nineteenth century. Men invented podalic version and the forceps. Midwives were unlettered and usually quite unteachable (p. 116). Men were kindly and sympathetic, midwives often brutal and rude (p. 120). Well-to-do women saw the benefits and kindnesses offered by the male midwives. Their attitude filtered down. A demand was created and met. The obstetricians came to be much wanted about the time the era ended. William Shippen, especially, brought English obstetrics to Philadelphia in the 1760's. In the nineteenth and twentieth centuries men (and women!) obstetricians have brought the boons of analgesia, anesthesia, prenatal care, and safe operative delivery.

Feminists should read this sane book carefully. A real debt is owed to their disliked men of the past, who were not chauvinists but fascinated physicians. If a woman prefers a well-trained modern midwife who knows her limitations, it is certainly her privilege to choose one. Allowing fathers in the delivery and operating rooms is a proper new emotional advance, furthered by feminists. I never had any objections, provided the father-to-be was stable emotionally. I must add that the midwives of old did not want fathers even in the house, let alone the birth room. Since I have seen how fast things can go wrong in labor and delivery, I question the safety of home delivery. However, such arguments are beyond the scope of the present review of this excellent little book.

308 Ingleside Drive
Fredericksburg, VA 22405

Portraits at Temple University School of Medicine

IN January 1981 the Department of Medical Communications of Temple University Health Sciences Center issued the fifth edition of its Gallery of Portraits. This attractive pamphlet contains a brief introduction by Dr. Leo M. Henikoff, Dean of the School of Medicine and Vice-President for Medical Affairs. The text reproduces, in reduced form, the thirty-eight portraits which presently comprise the collection. Each photograph is accompanied by a concise biographical note and other information. The notes are the work of Dr. Fred B. Rogers, Professor of Family Practice and Community Health, Temple University School of Medicine, and former editor of *Transactions & Studies*. The following are depicted:

RUSSELL H. CONWELL
JESSE O. ARNOLD
W. WAYNE BABCOCK
THE BABCOCK SURGICAL CLINIC
(a composite showing surgeons associated with Dr. Babcock)
HARRY E. BACON
M. PRINCE BRIGHAM
ROBERT M. BUCHER
W. EMORY BURNETT
AGNES BARR CHASE
THEODORE L. CHASE
W. EDWARD CHAMBERLAIN
KYRIL B. CONGER
THOMAS M. DURANT
O. SPURGEON ENGLISH
MATTHEW S. ERSNER
ROBERT HOUSTON HAMILTON
FRANK C. HAMMOND
JOHN FRANKLIN HUBER
CHEVALIER JACKSON
ROBERT LIVINGSTON JOHNSON
RICHARD A. KERN
JOHN A. KOLMER
LEROY W. KRUMPERMAN
WALTER IVAN LILLIE
JOHN ROYAL MOORE
WALDO E. NELSON
MORTON J. OPPENHEIMER
WILLIAM N. PARKINSON
VICTOR ROBINSON
GEORGE P. ROSEMOND
MICHAEL SCOTT
ROGER W. SEVY
HARRY SHAY
EARLE H. SPAULDING
ERNEST A. SPIEGEL
HERBERT M. STAUFFER
WILLIAM A. STEEL
SIDNEY WEINHOUSE

The Editors

Addendum

To "Analytical Psychology for the Family Physician," by Fred B. Rogers (*Transactions & Studies*, Series V, Volume IV, no. 3, pp. 180–185), please add the following note:

> The C. G. Jung Center of Philadelphia, 2008 Chancellor Street, Philadelphia, PA 19103, holds meetings on Thursday evenings at 8 p.m. during the academic year on topics related to Jungian thought. Membership information may be obtained from Barbara Crawford, Executive Director, in writing or after 6 p.m. at telephone no. (215) 567-7316.

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